AMATEUR RADIO

NOVEMBER 1948

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

NOW AVAILABLE . . .

LOW-PRICED

PHILIPS VALVES

FOR TRANSMITTERS AND MODULATORS

That new rig you are planning or the re-building of your present set-up can be improved by using a pair of 834's in the final stage, while for modulation, of course, the answer is a pair of 830B's in class B.

TYPE 834 TRIODE.

A transmitting triode designed for use as RF amplifier and oscillator, with maximum ratings up to 100 Mc/s. It may be used at 50% rating as high as 350 Mc/s. Power output at 1000 volts anode supply is 60 watts. Filament voltage 7.5 at 3.1 amperes. Driving power 6 watts. The price is £1/8/9 (plus 2/- duty).

TYPE 830B TRIODE.

With 6 watts driving power, two 830B's in Class B audio service will deliver up to 175 watts. At 1000 volts H.T. Zero signal anode current is 20 Ma and maximum 280 Ma. Filament voltage 10 at 2 amperes. This valve is also applicable as RF power amplifier for telephony and telegraphy.. The price . . . £1/2/3 (plus 2/- duty).

There is a discount of 10% on both valves to licensed amateurs.

TYPE 830B £1/2/3

TYPE 834 £1/8/9

PHILIPS ELECTRICAL INDUSTRIES OF AUSTRALIA PTY. LTD. *Sydney, Melbourne, Brisbane, Adelaide, Perth*

FOR THE EXPERIMENTER & RADIO ENTHUSIAST

Registered at G.P.O., Melbourne, for transmission by post as a periodical.

6D.

2 WINNERS from KINGSLEY

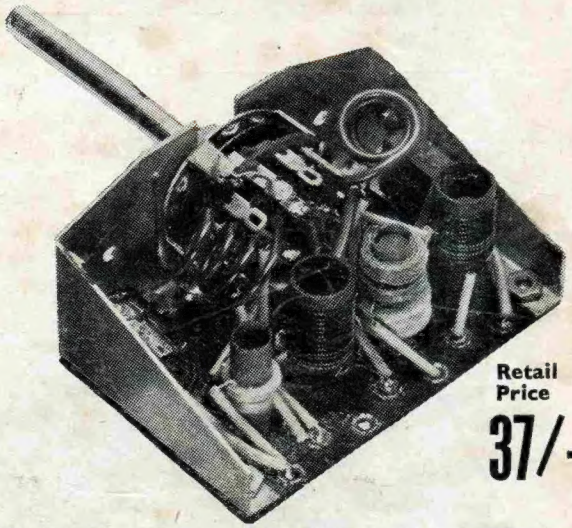
NEW DUAL-WAVE COIL UNIT

This new Kingsley Dual Wave Coil Bracket has not merely been reduced in size — it has been thoroughly designed by Kingsley's Research Engineers. It is no mere adaption of existing components, being engineered not only from the electrical but also the mechanical viewpoint.

No other D/W Bracket gives all these Features

- Each unit is core tuned.
- Models for every converter valve.
- Frequency coverage 5.95 megacycles to 18.5 megacycles and 540 to 1650 kC/s.
- Trimmers and cores are readily accessible.
- Coils and wiring well protected.
- Dimensions of unit: 3 ins. wide, 2 ins. deep, 1¾ ins. high
- Ease of wiring into chassis.
- Sturdy construction of unit.

Write for Further Details.



Retail Price **37/-**

★

Retail Price **29/6**

5" PERMAG. SPEAKER

TYPE KR5

The KR5 Speaker—latest addition to the Kingsley range features an improved seamless cone, cadmium plated housing and full matching transformer. The imported British magnet is of "Alcomax 2" — highest grade magnetic alloy.

TECHNICAL DATA:—

Overall Diameter—5 1/16".	Voice Coil Impedance 2.5 ohms
Baffle Opening—4½".	Overall Depth inc. trans. 2 3/16
Voice Coil Diameter—.640".	Overall Depth less trans.—2".

IMPORTANT.—*If your usual supplier is unable to supply your requirements of Kingsley Products, drop us a line mentioning his name and address.*

KINGSLEY QUALITY RADIO PRODUCTS

KINGSLEY RADIO

KINGSLEY RADIO PTY. LTD.

380 St. Kilda Road, Melbourne, Victoria . Phones: MX 1159, MX 3653

NOVEMBER 1948
Vol. 16. No. 11

EDITOR:
T. D. HOGAN, VK3HX,
Telephone: UM 1732.

MANAGING EDITOR:
J. G. MARSLAND, VK3NY.

TECHNICAL EDITOR:
J. C. DUNCAN, VK3VZ.

ASSISTANT TECHNICAL EDITOR:
A. K. HEAD,

COMPILATION:
R. W. HIGGINBOTHAM, VK3RN.

CIRCULATION:
J. F. IRVINE, VK3TU.

ADVERTISING REPRESENTATIVE:
W. J. LEWIS,
20 Queen St., Melbourne, C.1.
Telephone: MU 5154.

PRINTERS:
H. HEARNE & CO. PTY. LTD.,
285 Latrobe St., Melbourne.

MSS. and Magazine Correspondence should be forwarded to the Editor, "Amateur Radio." Law Court Chambers, 191 Queen St., Melbourne, C.1., on or before the 15th of each month.

Subscription rate in Australia is 6/- per annum, in advance (post paid), and A7/6 in all other countries.

Wireless Institute of Australia (Victorian Division) Rooms. Telephone: FJ 6997.

— IN THIS ISSUE —

Ionospheric Predictions for the Amateur Bands 3
Making a Simple Narrow Band F.M. Adaptor 7
A simple Low-Cost Hydraulic Beam Rotator 8
Designing a V.H.F. Transmitter 9
Time Marches Backwards 13
Ressurecting an L.M. Type Bendix Frequency Meter 14
Build Yourself a Bridge 16
An Accurate and Inexpensive Wavemeter 17
In Search of a Keyed V.F.O. 18
Contest News—VK2 Wins Remembrance Day Contest 19
Federal, QSL and Divisional Notes 21

AMATEUR RADIO

Published by The Wireless Institute of Australia, Law Court Chambers, 191 Queen Street, Melbourne, C.1

EDITORIAL

★

COMMERCIAL STATION OPERATION IN AMATEUR BANDS

The operation of commercial stations in Amateur Bands has always been a nuisance, and the increasing numbers of such interlopers is giving all active amateurs much food for thought.

Much has been written about our narrow bands and when it is considered that thousands of low powered signals are operating therein, it becomes of increasing importance to eliminate such high powered emissions by taking action to have them transferred to their correct allocation.

Unfortunately it is not easy to refer such information to the appropriate authorities without a certain amount of data giving call signs, date, time frequency, etc., to enable them to pass suitable details to the overseas authority concerned with such matters.

It is therefore desired that all commercial stations operating in amateur bands be logged and the information of such emissions be passed to Federal Councillors in each Division who will forward the data to the Federal Executive for appropriate action with the Postmaster General's Department.

PORTABLE EQUIPMENT

Most Amateurs have enjoyed the experience of operating equipment under field conditions, either on field days or with portable equipment normally operated in cars or boats.

With the arrival of the summer season it is opportune to remind members who have not already done so, that they should seriously consider the design and construction of low powered portable equipment which can be operated from vibrator or genemotor supplies.

Those experimenters with service experience who remember the occasions when they were responsible for the erection and operation of such equipment, will agree that no more enjoyable experimentation can be obtained than to operate your rig under such conditions.

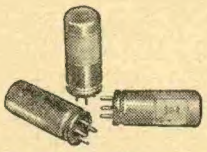
Apart from the opportunity for enjoyment thus obtained, there is real satisfaction in owning portable equipment which may be used for a national emergency service at short notice, as has been the case with those amateurs who interest themselves in bush fire prevention by assisting various country fire brigades.

Many interesting technical problems, from power supplies to aerials, can be tackled in this type of work whilst the technical skill required to design really compact and light weight equipment offers scope for those who take pleasure in constructive work requiring original thought.

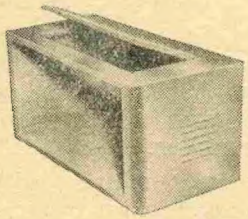
Federal Executive.

Homecrafts PTY. LTD.

Largest Stocks & Keenest Bargains for the Amateur!

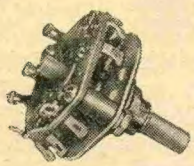


12 volt 4 Pin non synchronous Vibrators Standard Type usually 30/-. Bargain Price 12/11.



Steel Instrument and Communication Cabinets. Finished in Grey Crackle finish as illustrated. Small 7" high, 11" long, 5 5/8" deep. 30/-. Large 10 5/8" high, 22" long, 11" deep. 60/-.

Type 6K7G Valves. Electrically Perfect Loose Box only. Bargain Price only 4/11



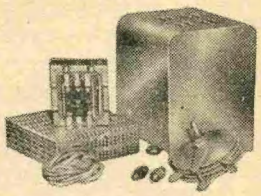
Single Bank OAK D/W Switches 6 x 2 double sided as illustrated usually 11/6 Cut to only 3/11.

Country and Interstate clients add freight or postage.

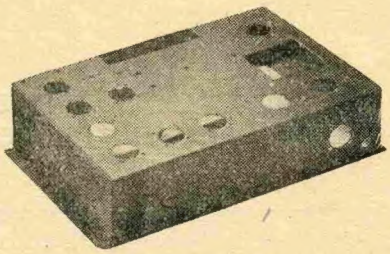
Block Condenser BARGAINS

.5 500 Volt Working 2/6
.02 8000 Volt Test 5/11
2 mfd 800 volt Test 4/3
1 mfd 800 volt Test 3/11
.1 1500 volt working 2/11
.5 6000 volt Test 5/11
4 mfd 450 volt working 5/11
1 mfd 450 volt working 2/6
.1 6000 volt Test 3/11

Available for Immediate delivery WX1 and WX6 Westinghouse Wesectors. Price 7/4.



Homecrafts 6 Volt 4 Amp Battery charger kit Kit includes 6 volt 4 amp English selenium Rectifier, Transformer, Black Crackle Finish Metal Case, 2 Terminals, and Hook-up wire. Complete Kit as illustrated, only £4/10/-.



RADIO CHASSIS for All Requirements

Black Crackle Finish Steel Chassis as Illustrated. Suitable for an 8 Valve Console Set. Size 14" x 9" x 13½". Price 15/9.

Mantel Chassis for 4 or 5 Valve Set. Steel drilled Chassis measuring 12" x 6½" x 2". Price 8/6.

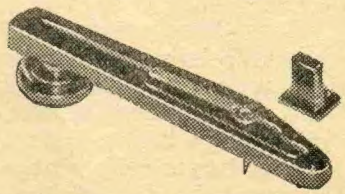
Portable Chassis for 4 Valve Portable. Steel drilled Chassis measuring 8" x 5½" x 2½". Price 8/6.

SPECIAL CHASSIS BARGAIN

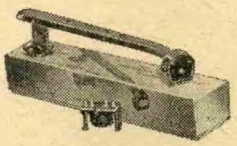
Steel drilled ducoed Chassis for 4 or 5 Valve Set. Only 1/11.

5 Valve Console Chassis Steel drilled Cadmium Plated. Measuring 12" x 9" x 3½". Price 13/9.

No.1—12" x 7" x 2½" without ends 8/-
No. 2—13" x 7" x 2½" with ends . . 9/9
No. 3—7" x 5" x 2½" with ends . . 6/6
No. 4—6" x 4" x 2" without ends 3/8
No. 5—13¼" x 10" x 2½" with ends 12/3
No. 6—8" x 5" x 2½" with ends . . 7/2
No. 7—10" x 6" x 2½" with ends . . 8/4
No. 8—17" x 10" x 3" with ends 17/5
No. 9—13" x 7" x 2½" with ends . . 9/-
No. 10—13" x 10" x 26" with ends 11/6

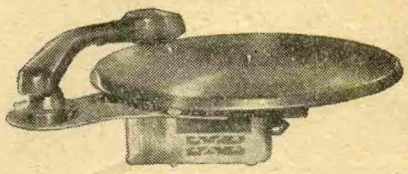


Pick up Bargain. English Cosmocord Crystal Pick ups. Streamlined Bakelite Crystal Pick ups—as illustrated. Reduced from £3/7/9 to 39/11.



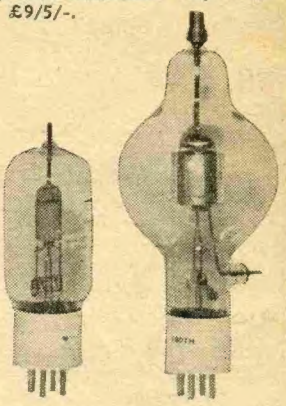
JUST ARRIVED

The new English Shefi High Fidelity Moving Coil Pick up. Complete with matching Transformer as illustrated. No Pre Amplifier Required. Price only £4/19/-.



Available for Immediate Delivery. English Collaro Electric Gramo Motors. The new AC47 Electric motor with Pick-up and Automatic stop complete as illustrated. £9/5/-.

American Imported Universal Microphones. High Fidelity hand type Dynamic Microphones with press to talk switch. Built in numetal 40,000 ohm matching transformer and 20' rubber covered shielded cable. Crisp clear speech assured. Price 10 gns. Complete.



IMPORTED AMERICAN EIMAC TRANSMITTING TUBES

Types available for Immediate Delivery.

Type 35T £3/19/0
Type 35TG £4/12/6
Type RX21 . . . . £4/9/0
Type KY21 . . . . £5/17/0
Type 100TH . . . £8/4/10

Write for free Characteristic Booklet.

HOMECRAFT SPECIAL SNAP BARGAINS

English Crystal Pick-up Cartridges. Reduced from 27/6 to 9/11
Large Full Vision Dials. Reduced from 25/ to 9/11
Iron Cored Permatune Coils, Aerial RF and Oscillator. Cut to 8/11 a set
4 Bank Dual Wave Switches. Reduced from 17/6 to 4/11
Electrolytic Condensers, 4 mfd 350V., 25 mfd 150V., 3 mfd 12V. Cut to 1/ea

290 Lonsdale Street, Melbourne. Cent. 4311

Also at Ballarat, Geelong, Hobart, Launceston, Burnie, Sydney, Newcastle

HOMECRAFT SPECIAL SNAP BARGAINS

Toggle Switches Reduced from 3/- to 1/6.

Speaker Transformers Reduced from 12/- to 4/11.

Voltage Dividers 1500 ohm Reduced from 4/6 to 1/-.

Ionospheric Predictions for the Amateur Bands

BY A. L. GREEN*, D.Sc., Fel.I.R.E.

INTRODUCTION As announced in a previous issue of this magazine, the Commonwealth Observatory has agreed to supply special ionospheric forecasts to the Wireless Institute of Australia for a trial period of six months. During that period it is hoped that Amateurs will carefully examine the forecasts in the light of their own practical experience of long-distance communication.

Two objects will thereby be achieved. Firstly it is to be expected that actual experience with the Amateur band forecasts will provide practical data on the reliability of the predictions. When discrepancies occur between forecasts and experience, as no doubt they will, careful examination of the data should lead to an improvement in the forecasting procedure. Secondly, if the forecasts prove to be of value in facilitating Amateur contacts between Australia and other countries, the Wireless Institute will have made an important conribution to one of the fundamental objects of Amateur Radio.

FORECASTING PROCEDURE The maps in Figures 1 and 2 indicate the general basis for the Amateur band forecasts. The world includes seven principal zones, from the point of view of the Australian Amateur, and it is desired to give ionospheric predictions of the times of the day when two-way communication within the Amateur bands will be possible, both from the Eastern and the Western States. In order to reduce the whole forecasting procedure to manageable dimensions it has been found to be necessary to select representative terminals in Australia and in the world zones as follows:—

Zone	Region	Terminal
1	Western Europe	London
2	Mediterranean	Cairo
3	N.-West America	San Francisco
3a	N.-East America	New York
4	Central America	Barbados
5	South Africa	Johannesburg
6	Far East	Manila

The above terminals are those used in the accompanying charts for the forecasts applicable to Canberra. For example, the chart labelled C-Z6 applies generally to Amateur contacts between the South-Eastern Australian States and China, Japan and the Philippines. The actual forecast is made for a specific circuit between Canberra and Manila. Similarly the chart labelled C-Z3A-S.R. is for the Short Route between Canberra and New York over the Pacific Ocean, whereas the chart C-Z3A-L.R. is for the corresponding Long Route over Africa.

During the trial period of these forecasts it will not be feasible to give a complete service for Amateurs in Western Australia. Zone 2 (Mediterranean) has been omitted on the assumption that the shorter distance from Perth, as compared with the distance from Canberra, renders this forecast unnecessary. The chart labelled P-Z1 should give reasonable results for both Western Europe and the Mediterranean countries. Zone 4 (Central America) has been omitted from the Perth predictions for the reason that the Perth-Barbados great circle travels through the northern auroral zone in which ionospheric disturbances are liable to introduce uncertainty into the forecasts. Somewhat similar conditions exist on the Perth-New York circuit (P-Z3A) and it is hoped that Amateur experience with these contacts will provide valuable data on ionospheric conditions in high northern latitudes. Another difference between the Perth and the Canberra forecasts is that chart P-Z6 is for the Perth-Shanghai circuit as compared with Canberra-Manila for C-Z6.

USE OF THE CHARTS Each chart is in the form of a graph with ordinates marked in megacycles per second (7, 14, 21 and 28 Mc.) and abscissae in hours at Greenwich Mean Time. The curve labelled M.U.F. indicates the maximum usable frequency for communication between the selected terminals. Similarly the curve (usually in two portions) marked L.U.F. is for the lowest useful high frequency over the same path. If all frequencies were available to the Amateur the operating procedure would

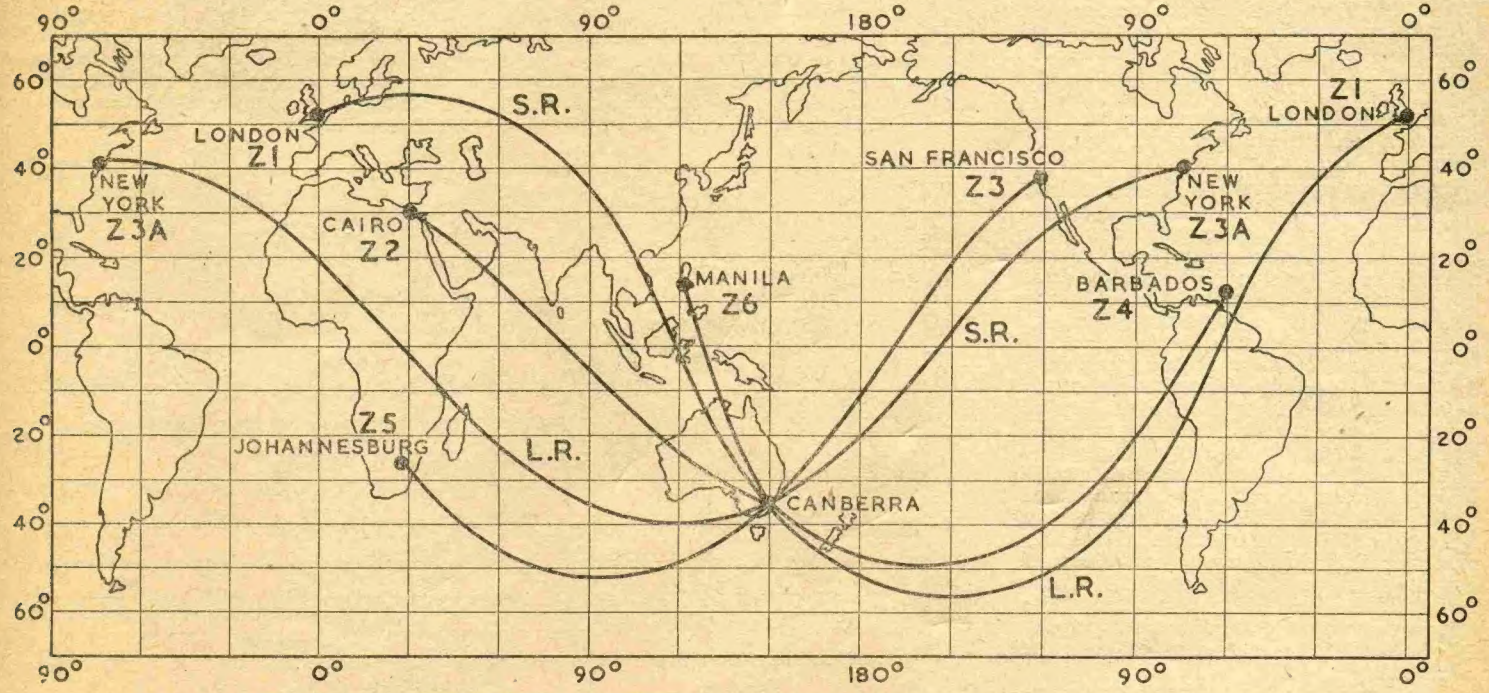


FIGURE I. GREAT CIRCLES FROM CANBERRA TO THE AMATEUR ZONES.

* Officer-in-Charge, Ionospheric Predictions Service of the Commonwealth Observatory, Department of the Interior.

merely be to select a frequency between the M.U.F. and the L.U.F. at the desired time of day.

Due, however, to the fact that the Amateur bands are located, at the moment, at approximately 7, 14 and 28 Mc., the procedure to be followed by the Amateur must be more specific. Considering, by way of example, the possibility of making a contact between Melbourne and Montreal, one turns to the charts labelled C-Z3A-S.R. and C-Z3A-L.R. (Canberra-New York) as being the nearest available to the desired circuit. The charts indicate that the 28 Mc. band should be open on short route for a few hours before midnight G.M.T., but closed throughout the day on long route. The 14 Mc. band should be available on short route for the greater part of the day with the exception of the period around midnight G.M.T., when the L.U.F. curve approaches closely to 14 Mc., and again in the forenoon G.M.T. when the M.U.F., curve dips towards 14 Mc. The first of these two exceptions may, however, be removed by long-route operation in the 14 Mc. band which should be possible for a while before midnight G.M.T.

Lastly it is important not to overlook the possibility of the 7 Mc. band in the forenoon G.M.T. Use of this band will, of course, depend on freedom from thunderstorms but it should provide about three hours of reliable communication from Melbourne to Montreal on many days in the month.

Another example might be that of a contact desired between Kalgoorlie and Hong Kong. The nearest equivalent is chart P-Z6 (Perth-Shanghai) which indicates many possibilities. The 28 Mc. band should be open for at least ten hours following midnight G.M.T. The 14 Mc. band might be available for the whole day, with the exception of noisy conditions for a few hours after midnight G.M.T. due to the proximity of the L.U.F. curve to the 14 Mc. band. Even the 7 Mc. band should give contacts for nearly ten hours of the day after noon G.M.T.

RELIABILITY OF PREDICTIONS

It is emphasised that ionospheric predictions for the Amateur bands relate only to the average conditions to be expected during the month. It is not feasible, in the present state of the forecasting art, to predict conditions with great accuracy for any specified day. It is known that the M.U.F. undergoes variations from day to day and it is also a matter of practical experience that ionospheric storms occasionally disrupt high frequency communication. Another well-known effect is the occurrence of abnormal or sporadic ionisation in the E region of the ionosphere. Generally speaking this phenomenon is welcomed by the Amateurs, particularly those operating in the 50 Mc. band, but it is not an easy matter to include any sporadic effect in a forecast of average conditions.

In addition to these day-to-day variations in the ionosphere, there are two systematic sources of error in ionospheric predictions. Firstly the general level of the M.U.F. curve rises and falls in sympathy with the smoothed value of the monthly sunspot number. It is obvious, therefore, that an error in the forecast of sunspots for any specified month will produce an error in the general level of the M.U.F. curve. During recent months the observed sunspot number has been considerably greater than the predicted value, as forecast from past sunspot cycles, with the result that communciation has sometimes been possible at frequencies greater than the predicted value of the maximum usable frequency.

Secondly the value of the M.U.F. for long-distance communication depends on the actual height of the ionosphere. Unfortunately it is not possible, so far as in now known, to make experimental measurements of true heights of reflection since all known methods of ionospheric sounding are found to measure virtual heights, i.e. the height that a wave would reach if it travelled exactly with the velocity of light throughout its path. The practical effect of this discrepancy between actual and virtual heights, as it affects ionospheric predictions, is that the predicted M.U.F. curve may be too low during the dawn period. By way of example, the trough in the M.U.F. curve on chart C-Z3A-S.R. occurring at about noon G.M.T. corresponds with sunrise at New York. During this period it may sometimes be possible to maintain communication with Australia in the 14 Mc. band in spite of the M.U.F. curve dipping below this frequency.

FORECASTING METHODS

It does not seem to be necessary to give details in the present article of the fundamental methods of ionospheric forecasting. Complete descriptions have recently been given (see bibliography) of the methods developed during the last war by the U.S. National Bureau of Standards and by the U.K. Department of Scientific and Industrial Research. The idea lying behind the prediction of the L.U.F. is, however, of recent origin and merits a brief description.

Remembering that we are concerned here only with average conditions, and that sporadic effects are not included, the broad picture of long-distance radio communication is based on the idea that a satisfactory circuit can be maintained only via the F region of the ionosphere at a height of about 300 km. above the earth's surface. It is known that the reflection coefficient of the E region, at a height of about 100 km., is much less than that of the F region, the difference being due to the fact that the density of the atmosphere decreases as the height increases. Consequently it is the aim in long-distance communication to select a frequency for the transmissions which will enable the signals to penetrate the E region but be reflected by the F region. From this point of view the M.U.F. curve on an Amateur band chart gives the penetration frequency of the F region whereas the L.U.F. curve correspondingly indicates the penetration frequency of the E region. It immediately follows that signals at a frequency lying between the two curves will penetrate the E region, as is desired, and will be satisfactorily reflected at the F region.

This is the simple picture but to it one must add some consideration of the mechanism of multi-hop propagation between the ionosphere and the earth's surface. Considering firstly a ray that leaves the transmitting aerial at zero angle of incidence, i.e., tangentially to the earth's curved surface, it is easy to show that it will attain a height of about 325 km. (the F region) at a distance of 2,000 km. from the transmitter. The tangential ray will therefore travel by 4,000 km. hops and this is the distance for which the M.U.F. is calculated. By way of example, communication between Canberra and New York will

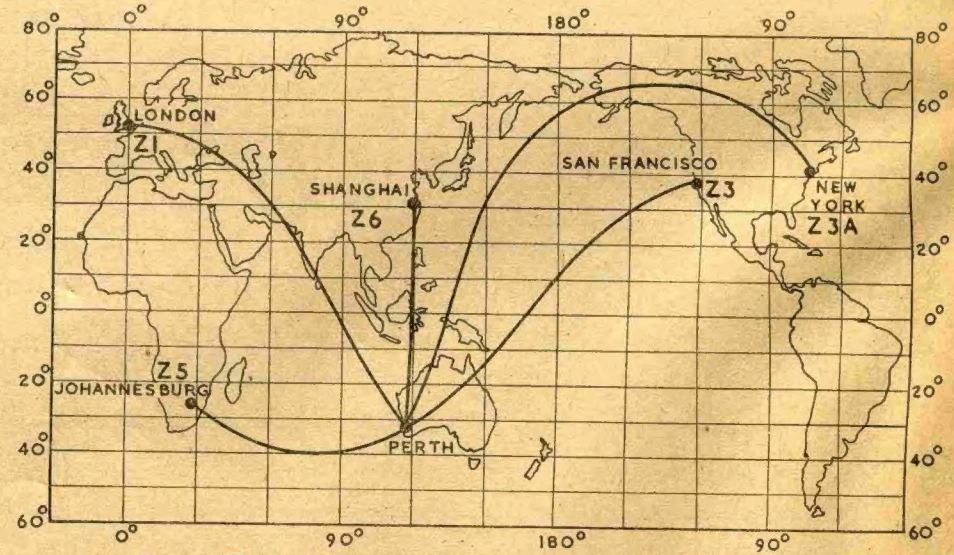


FIGURE 2. GREAT CIRCLES FROM PERTH TO THE AMATEUR ZONES.

require at least four of such 4,000 km. hops if the transmitted frequency is close to the maximum. In other words the distance of 4,000 km. is the skip distance for a signal transmitted at the maximum usable frequency. Signals at higher frequencies will penetrate the F region while only those signals at frequencies lower than the M.U.F. may travel by hops smaller than the maximum distance of 4,000 km.

We must also consider signals that leave the transmitting aerial at some small angle of elevation, say up to 10 degrees above the horizontal. A ray at this angle of elevation will attain a height of about 110 km. (the E region) at a distance of 500 km. from the transmitter and, if it can penetrate the E region, it will eventually rise to the F region at a distance of about 1,250 km. If this signal does penetrate the E region it will travel by 2,500 km. hops between the earth and the F region. If it is held down by the E region it will be returned to the earth at a distance of only 1,000 km. from the transmitter.

It is clear, therefore, that E region reflections suffer from two disadvantages. Firstly the E region is relatively a poor reflector in its normal state of ionisation. Secondly E region hops are much shorter than those via the F region, with the result that long distances (above 10,000 km.) involve a large number of successive reflections between E region and earth, and signal intensity is lost at each point of reflection. Consequently the L.U.F. curve on the Amateur band charts indicates the frequency at which the useful signals, up to an angle of elevation of about 10 degrees, are held down by the E region and thereby become too weak for long-distance communication.

Another way of defining the L.U.F. is from the length of hop. From the numerical data given above it is clear that the L.U.F. is the skip frequency of the E region for a transmission distance of 1,000 km. Signals at frequencies above the L.U.F. can penetrate the E region and, if the M.U.F. of the F region is greater than the L.U.F. determined by the E region, they can be reflected as is desired by the F region.

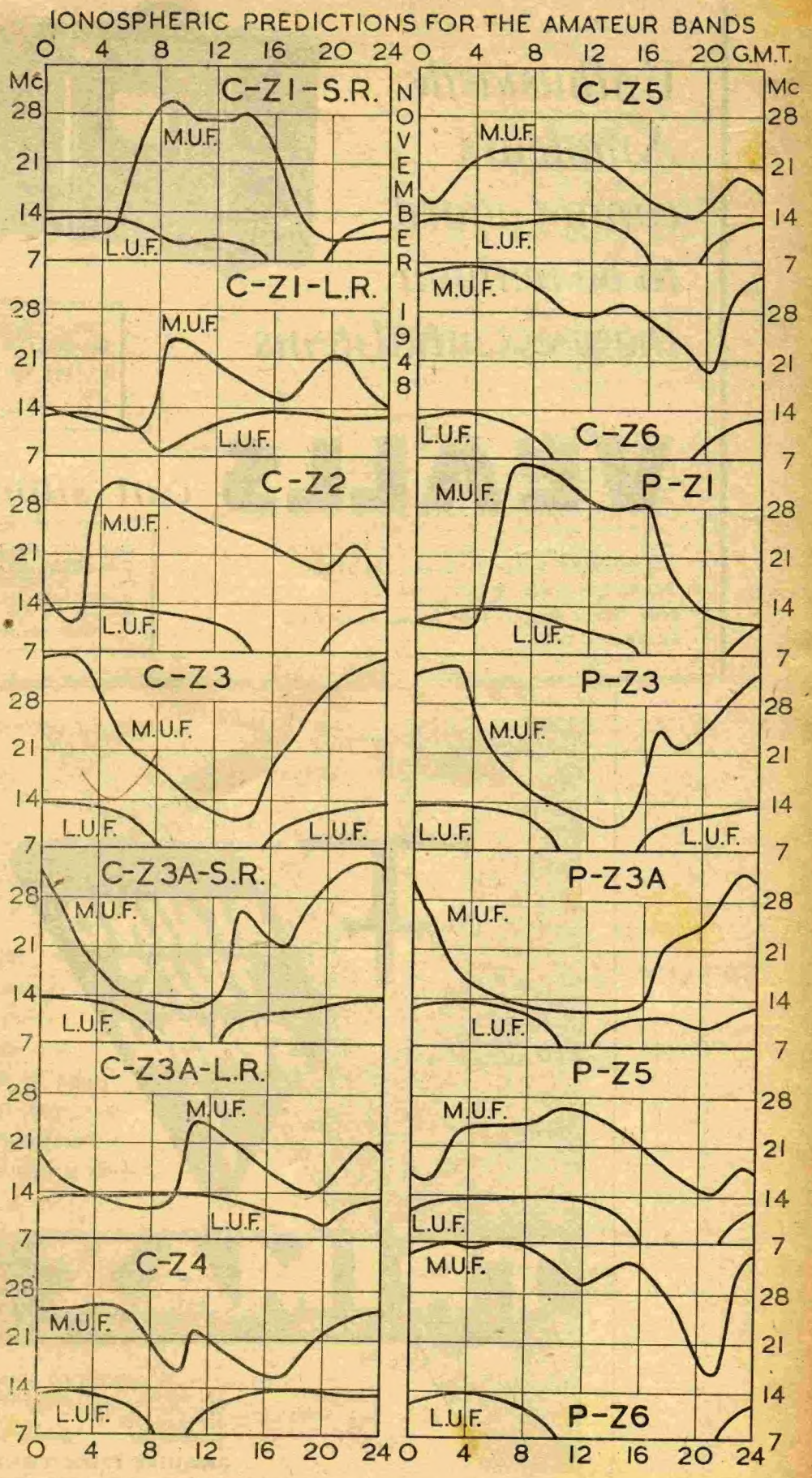
BIBLIOGRAPHY

1947—Appleton, E. V., "The Investigation and Forecasting of Ionospheric Conditions." J. Inst. Elec. Eng., vol. 94, part IIIa, No. 11, p. 186.

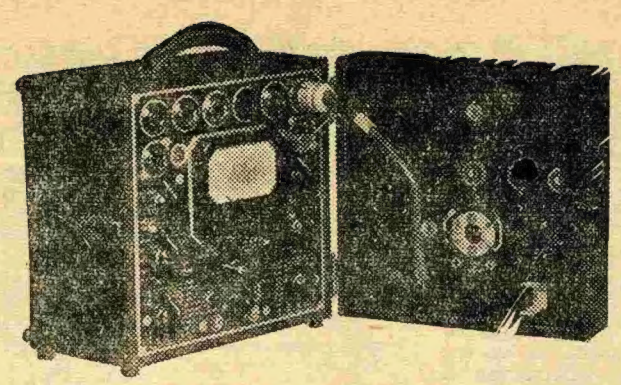
1947—Tremellen, K. W., and Cox, J. W., "The Influence of Wave-Propagation on the Planning of Short-Wave Communication." J. Inst. Elec. Eng., vol. 94, part IIIa, No. 11, p. 200.

1948—Dellinger, J. H., and Newbern Smith, "Developments in Radio Sky-Wave Propagation Research Applications during the War." Proc. Inst. Rad. Eng., vol. 36, p. 258.

1948—"Radio Propagation Bulletin," Ionospheric Prediction Service of the Commonwealth Observatory. Wholesale Distributors: Gordon and Gotch (Australasia) Limited.



Enthusiastic Amateurs cannot afford to be without these essential items



TRANPRO VALVE & CIRCUIT TESTER

A.C. or Vibrator operation. Reads milliamperes, D.C. and A.C. volts, output volts and tests resistors, condensers and valves.

PRICE £32/19/6

(plus 10% tax) Terms available.

ROBLAN MIDGET CONDENSERS

Three-Gang midget Variable Condensers, suitable for 88-108 M/C F.M. Band. 25/- discount to hams.

"University" SGA SIGNAL GENERATOR £45 (plus tax)

LATEST EDITION !

Australian Radio Service Manual. Latest edition—Vol. 6. 1947 Receivers. At Vealls, 15/- per copy.

NOW! "University" Short Wave Converter, complete £9/8/11

VEALLS *can supply all your needs !*

243 Swanston Street, Melbourne. FJ 3145;
299 Chapel Street, Prahran, LA 1605.
Mail Orders Box 2141T, G.P.O. Melbourne.
Established 1911.

CONSULT VEALLS FOR YOUR P.A. REQUIREMENTS

Full range VELCO Amplifiers and Microphones, etc. (At Swanston St., ask for Mr. Horman).

SPECIAL SERVICE TO AMATEURS CHASSIS CUTTING SERVICE

Any chassis cut to the size and specifications you require. Quick service, discount to Hams.

Communication Sets built to order. Let Vealls quote !

BEHIND THIS SYMBOL !

Every transformer looks to be simply coils of wire on a core . . . but the beauty of Trimax Transformers is more than skin deep! Long experience and high standards of technical ability ensure that the unseen parts of your Trimax Transformer will prove their reliability in every test.

TRIMAX *Transformers*

Division of CLIFF & BUNTING PTY. LTD. — 29-35 FLEMINGTON RD., NORTH MELBOURNE, VIC.

INTERSTATE REPRESENTATIVES:

SYDNEY: L. B. Graham, 5 North York St.

BRISBANE: Chandlers Pty. Ltd. Cnr. Albert & Charlotte Sts.

ADELAIDE: C. N. Muller, Worando Bldgs., Grenfell St.

PERTH: R. D. Benjamin, 197 Murray St.

LAUNCESTON: W. & G. Genders Pty. Ltd., 53 Cameron St.

ENQUIRE FROM YOUR NEAREST DEALER

Making a Simple Narrow Band F.M. Adaptor

BY C. H. CASTLE*, VK5KL

With the increasing use of n.b.f.m. on 28 Mc. by American phone stations, it is in keeping with the times to be able to give the other fellow a good report on his signal, instead of just detuning your receiver slightly until his speech is reasonably intelligible, and letting it go at that.

The advantages of his using n.b.f.m. are lost by your reception on a a.m. receiver. To take advantage of the opportunity offered, and to gain experience of n.b.f.m. a simple adaptor was constructed, and is being used in conjunction with the receiver at the writer's station.

CIRCUIT

Reference to Fig. 1 will show the simplicity of the Adaptor.

The limiter stage consists of a 6SJ7 sharp cut-off tube operating with very low plate and screen voltages, and without fixed bias. This is done so that the stage will be easily overloaded by the incoming signal, thereby removing the amplitude modulated components from the carrier. The limiter is coupled to the 2nd i.f. stage with a 5 pF. coupling condenser, and the grid is returned to ground through the 1 meg. resistor.

Note that the cathode goes direct to earth. The plate and screen-grid receive their h.t. through the voltage divider R2, R3, R4. Due to the high value of R4 (0.25 meg.) and the low values of R2 and R3 (each 30,000), the voltage applied to the plate and screen of the limiter will be very low, therefore correct limiting will be obtained.

Do not use this circuit without R4, otherwise limiting will not be correct, apart from the quick demise of the limiter due to excessive plate current.

The discriminator is coupled to the limiter through the discriminator transformer described later. This transformer has two secondary windings, one tuned above and one below the centre carrier frequency.

With no modulation on an f.m. carrier the rectified r.f. across the load resistors R5 and R6 cancel. As the incoming carrier is frequency modulated, the voltages appearing across R5 and R6 become addative and an audio voltage will appear between A and C.

MAKING THE DISCRIMINATOR TRANSFORMER

The only snag was the discriminator transformer but this was overcome after several attempts, and the following procedure was found to work satisfactorily.

As can be seen from the circuit diagram, the transformer is for 455 Kc. and uses a double section primary and secondary winding. This was constructed out of two iron-cored 455 Kc. i.f. transformers. Take one and carefully remove the wax on the former between windings and after softening the former and coil at the top with a lighted match, push the coil down until it is alongside the other at the bottom of the former. Next remove the fitting that holds the iron slug from the top of the former. Remove both coils from the other transformer, and place on the first former at the top, as in Fig. 2, and replace the slug fitting. Care should be taken to see that the coils are replaced as taken off so as not to reverse the windings.

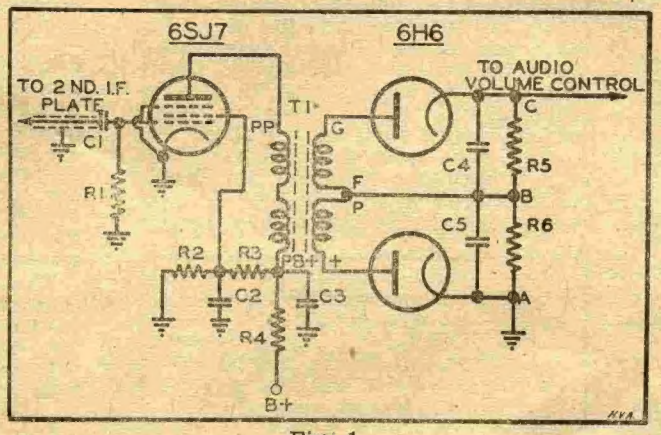


Fig. 1.

R1—1 Megohm. T1—See text.
R2, R3—0.03 Megohm. C1—5 pF.
R4—0.25 Megohm. C2, C3—0.1 uF.
R5, R6—0.1 Megohm. C4, C5—100 pF.

The coils are now connected as in Fig. 2, and two leads attached for the primary connections. The windings can now be rewaxed.

Wiring of the adaptor can now proceed, and when completed, connected to the receiver either by temporary shielded leads to i.f. plate and to audio, or the necessary leads taken to a socket on the back of the receiver and the adaptor plugged into that. A toggle switch is necessary to switch the audio from a.m. output to adaptor for n.b.f.m.

ALIGNING THE ADAPTOR

Using a signal generator the first step is to re-align the i.f. stage to 455 Kc as the loading of the adaptor will have put it off tune. Switching the audio to n.b.f.m., and using a high resistance voltmeter (20,000 ohms per volt), connect it across the first output load resistor from A to B (Fig. 1) noting if the polarity is correct.

Detune the signal generator 10 Kc. to either 465 or 445 Kc. and tune the transformer slug (underneath one) to maximum reading on the voltmeter. Connect meter from A to C, now reversing polarity. Retune signal generator to 455 Kc., and tune the top slug for zero volts. The adaptor is now ready for test.

TESTING THE ADAPTOR

With no signal input to the receiver, switching to n.b.f.m. the noise level and output increases considerably. When a signal is tuned in the noise level drops. This shows that the adaptor is working OK.

Receiving a.m., tune in an a.m. signal and switch to n.b.f.m., the a.m. signal appears to lose its modulation and should be distorted, but can be received OK by tuning to either side of the carrier. Tests show here that receiving a n.b.f.m. station on a.m. the speech is hard to follow but becomes 100% on switching to n.b.f.m. reception.

NOTE.—When using the adaptor the a.v.c. switch on the receiver is switched off. Although this puts on the b.f.o. in some receivers, it is not audible as the 2nd detector portion of the set is not in use at the time.

CONCLUSION

No technicalities will be gone into here as reception differs with strength of signal and deviation ratios used in transmission and is treated in most text books. It is interesting to see the theory work out and at the same time bring your station in line with modern practice.

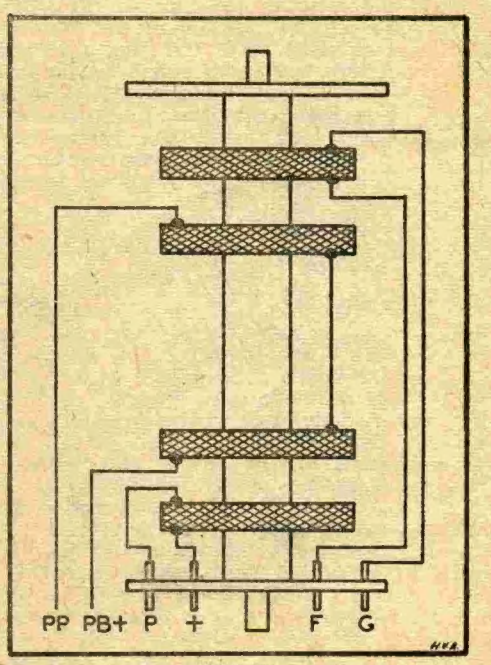


Fig. 2.

* c/o. Dept. of Civil Aviation, Darwin.

A Simple Low-Cost Hydraulic Beam Rotator

BY L. P. MONCUR*, VK3LN

Confronted with the problem of placing a rotary beam at the top of a 105 foot mast, with a major requirement of a lightweight motor which could be pulled up on the halyard, this hydraulic rotator proved the answer, as the total weight of the 3 element series-phased beam, rotator, gib pole, water line, and co-ax feed line is under 10 lbs, and is not nearly the potential danger at the top of the pole as a 50 lb. prop. motor.

The idea has seven major advantages:

1. Extremely light in weight.
2. Absolutely silent in the receiver.
3. Any extreme of speed can be accomplished with the turn of the tap.
4. Can be mounted at any distance from the shack.
5. "Nylex" water line can be run underground to the antenna pole.
6. As the rotator cannot make more than one revolution, the feed line can be connected directly to the beam, without slip rings or inductive loops.
7. Perhaps the main one—you stand an excellent chance of getting some change from the pound spent on the gear.

CONSTRUCTION

The rotator is constructed from an old hand motor-pump, which can usually be had for the taking away, from the junk pile at the local garage.

With a hack saw cut a spiral track ¼" wide running about 400°, in the top half of the pump, see Fig. 1. At the bottom of the track file a small keyway to hold the beam in a fixed position when not in use. This spiral is arranged so that the bottom of the keyway is ½" less than **half** the pump length. To obtain a smooth spiral track, it is advisable to cut a strip of cardboard ¼" wide, and fix one end at the required point with plastic tape. Wrap the cardboard around the pump barrel to obtain the correct spiral described, and fix this end with plastic tape also. A steel scriber can then be run down the cardboard strip to mark the barrel, and the cardboard removed.

The top cap of the pump is drilled out to take a ½" water pipe. The water pipe is cut ½" less than the length of the pump stem, plus a flange to take the beam, and welded where shown. A ¼" diameter pin, ½" long, is welded to the side of the water pipe and the whole unit described is then placed over the stem of the pump and bolted down, using the original handle bolt.

Check the washer, and give a liberal supply of water pump grease, and place in the barrel. Mark the barrel at the bottom of the washer when the pin is 360° away from the keyway, and around this line drill a dozen holes, 1/32" in diameter, this ensures that the line will never be required to carry more pressure than the weight of the beam itself. See that the inside of these holes are cleaned off, otherwise the leather washer will be damaged.

The water feed line is of 4 mil. clear "Nylex" sleeving, 3/16" inside diameter, the type obtainable as insulation sleeving, and its low cost (about 16/- per 50 yards) makes the whole thing worthwhile. This feed line is connected to the normal air outlet of the pump, and run back to a stop tap on the water mains (Fig. 2), making sure to break down the pressure to 3/16" size with metal pipe fittings, which will withstand the water pressure. A ½" plug is fitted to the stop tap, and drilled to take two 3/16" outside diameter copper tubes, which are sweated into the plug. The other end of the copper tube, which takes the "Nylex" sleeving, is tinned with solder to make a tight fit. The remaining tube is the by-pass, and is controlled by a standard petrol tap. The water is then taken to the nearest drain or your favourite vegetable plot. About one cupful of water is required for each revolution of the beam, and as the system remains full of water when not in use, this is the only water used.

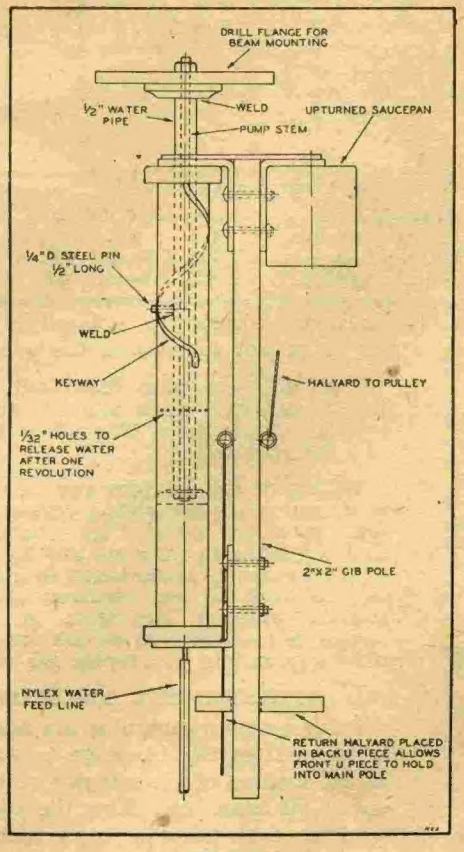

DRILL FLANGE FOR BEAM MOUNTING
½" WATER PIPE
WELD
UPTURNED SAUCEPAN
PUMP STEM
¼" D STEEL PIN ½" LONG
WELD
KEYWAY
HALYARD TO PULLEY
1/32" HOLES TO RELEASE WATER AFTER ONE REVOLUTION
2"X2" GIB POLE
NYLEX WATER FEED LINE
RETURN HALYARD PLACED IN BACK U PIECE ALLOWS FRONT U PIECE TO HOLD INTO MAIN POLE

Fig. 1.

General constructional details of rotator showing mounting of pump.

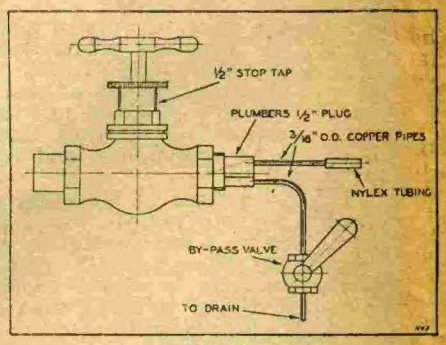


Fig. 2.

Method of water outlet from water mains.

The hydraulic rotator is mounted on a small gib pole (Fig. 1), together with a small upturned saucepan, large enough to go over the top of the mast, and a metal "U" piece at the bottom. The whole unit is pulled up on the halyard, and the saucepan goes over the top of the main pole, thereby removing all weight from the halyard. The "U" piece fits around the main pole and is held there by the halyard return.

There is no reason why this idea could not be used for 14 or 28 Mc. beams, as the weight of a 4 element 14 Mc. beam is nothing when compared with a line full of wet clothes, as occurs with the hydraulic rotary clothes hoist. If the weight of the beam is not sufficient to ensure a water-tight pressure on the pump washer, it is not much of a worry as it only means allowing a drop or two of water through the mains tap to compensate for it, anyway it works like a charm at VK3LN.

SOCKET-PIN PROTECTOR

When you are stripping some of the gear and want to be able to use the parts again in another rig, damage to the fragile socket-pins can be avoided easily by plugging an old tube in the socket while you unsolder the connections. The pressure of the tube pins against the socket terminals keeps them straight, and prevents bending and loosening.

CHEAP MOUNTING FEET

A short length of ½" rubber tubing, available in almost any hardware shop, may be used to provide cheap mounting feet for the usual steel chassis used in Ham construction. Cut the tubing into four pieces, and then slit each piece lengthwise. Slip one piece on each corner of the chassis. The feet will prevent the chassis from scratching the furniture, and if you're afraid of scratching the chassis when you have it on the bench for testing or repair, a set of "feet" can be kept handy to be slipped on until the chassis is returned to the rack.—QST, Sept., 1948.

* 235 Union Road, Ascot Vale, W.2, Vic.

DESIGNING A V.H.F. TRANSMITTER

BY J. N. WALKER*, G5JU

Whereas it used to be considered that special V.H.F. technique must be applied to frequencies above 30 Mc., it is now recognised that normal circuitry can be used up to at least 60 Mc., providing the valves are suitably chosen and the physical dimensions of the associated components kept reasonably small. Many readers will have experience with crystal controlled transmitters with final frequencies in the region of 50 to 56 Mc. but may not be familiar with a few circuits which can be easily applied to their existing transmitters and which will result in improved efficiency.

As frequencies rise into the very high region, several inter-related difficulties arise. Due to the greater relative effect of valve and other stray capacities, the coil sizes become small and the Q values low. Driving power is insufficient and loss of efficiency results. The latter means that heat dissipation inside the valve is greater than it should be and the input has to be adjusted accordingly. Generally speaking, a larger valve than is really necessary has to be employed.

A little juggling with the circuitry will improve matters all round. Increasing the efficiency of the early stages will result in greater power output and, in cases where it has been necessary to struggle to obtain the last ounce of drive, a distinct improvement will result.

The special valves now made for V.H.F. work can also make a considerable difference, particularly the twin tetrodes (832, 815 and 829). Their drive requirements are low and useful inputs (and outputs) are possible with relatively low anode voltage. Further, the form of construction of these valves assists in the design of a compact circuit with short wiring. The internal screen - by-pass condenser promotes stability, usually somewhat difficult to achieve with beam tetrodes.

In the first place, it is assumed that the various stages in the transmitter are frequency **doublers** and not multiplying three or more times. The usual circuit may be as shown in Fig. 1a with capacitative coupling between stages. Alternatively, the grid circuits may be separately tuned coil condenser combinations with link coupling, Fig. 1b. In both cases, the stray capacities, represented by the valve electrodes, tuning condenser minimum and various other capacities, are in parallel with the coil inductance and add up to a formidable total—often 40 pF.—which at high frequencies, is a serious drawback. The inductance which can be used is necessarily small, the Q or coil magnification is low, as also is the dynamic resistance of the tuned circuit and, with the comparatively low input impedance of the valve also in parallel, it is obviously a difficult matter to induce voltage of reasonable magnitude across the circuit.

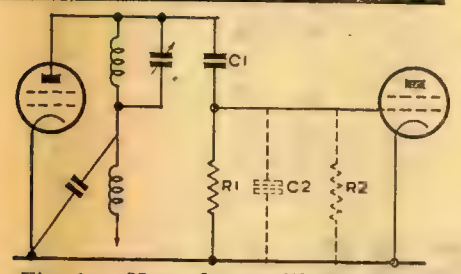


Fig. 1a.—Normal capacitive coupling. Stray capacities and loading represented by C2 and R2, are in parallel with the tuned circuit, which condition seldom allows the proper L/C ratio to be used.

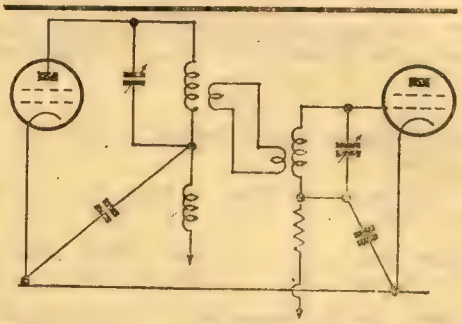


Fig. 1b.—An improvement over Fig. 1a, but the tuned circuits still have the stray capacities in parallel.

The circuits in Fig. 1 are both single-ended. By converting them to balanced or double-ended circuits, as in Fig. 2 operating conditions are definitely improved. The output capacity of V1 and the input capacity of V2 are now in series across the coil whilst the damping effects of the valve impedance are much reduced. Consequently, the size of the coils can relatively be much larger. The actual increase will depend largely on the value of the tuning condensers in relation to the stray capacities but a sixty to seventy-five per cent. increase in the number of turns will be correct in the majority of cases.

Tuning will be noticeably sharper and more care in adjustment of each stage will be called for. Split-stator tuning condensers are necessary, the circuit finding its earth point via the earthed rotor. The centre tap on the coil may be approximate and it must not be earthed, either directly or by means of a blocking condenser, else the balance of the circuit will be upset. A good choke, or alternatively, a resistor of low value (470 to 1,000 ohms), should therefore be inserted in the lead to the centre tap.

FREQUENCY TREBLERS A pentode or tetrode valve, over-biased and driven hard, will give practically as much output on the third harmonic as on the second. Advantage may be taken of this feature to reach the final frequency in fewer stages than would otherwise be necessary.

It has been found that the balanced circuit is not so efficient as the single ended in a stage designed to give odd harmonic multiples (e.g. the third). When tripling, therefore, the single-ended circuit should be used but with the anode (or grid) tapped down the coil about half way, to remove some of the effects of valve capacity and loading.

Still better is a push-pull tripler stage, which will give greater efficiency and output. The twin tetrode—in particular the 832—lends itself well to the purpose. The circuit will be of the normal type, with split-stator tuning in both grid and anode circuits, the latter, of course, being tuned to three times the frequency of the former. Even harmonics cancel out and no second harmonic output can be obtained.

PRACTICAL CIRCUITS In the first place, the reader must decide the fundamental frequency—which, it is assumed, will usually be a crystal, and the sequence of following stages, which may be doublers, treblers or a combination of both. In order to save a valve, the first stage should be a tritet, with the output on either the second or third harmonic. From then on, balanced circuits with capacitative coupling will prove both simple and efficient.

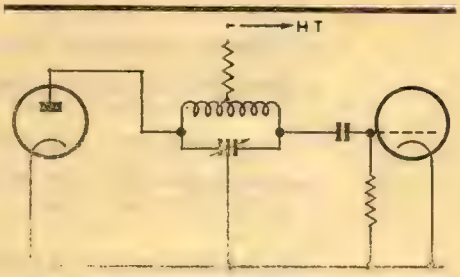


Fig. 2.—Balanced circuit, with the stray capacities effectively in series. Much greater coil sizes can be used.

A number of split-stator condensers will be required and the sizes of the coils will probably call for some experimental work. The L/C ratio of each tuned circuit, for efficient operation, should be kept as high as possible, hence small condensers, such as the Eddystone Cat. No. 583 or 584, are quite suitable.

The final frequency multiplying stage should be link-coupled to the tuned grid circuit of the **power amplifier**, which, it is assumed, will be **either an 832, 815, 829B** or one of their British equivalents. With 829B, and input of up to 100 watts, an output of up to 60 watts should be realised without difficulty.

(Continued on Page 11)

* Technical Department of Eddystone Works, Stratton & Co. Ltd., Birmingham, England.

DON'T READ THIS

UNLESS YOU WANT

BARGAINS

- BENDIX RADIO COMPASS, M.N. 26 C. Frequency coverage 150-1500 kilocycles; 12 valves, with Genemotor, 24 volt input; uses popular 6 volt series valves, 6K7, etc. Price less cable and valves £6/10/-
  There's only a few; be early!
- GENEMOTORS.—A.T.5, A.R.8 (complete). Slightly-damaged Switches, 24 volt input, 550 and 300 volts output, at 250 mills. To clear £3 0 0
- RECTIFIERS, Copper Oxide; 12 volt at 100 mills; S.P. Bridge. Ideal for Relay operations 7/6 each. Also 4 to 5 volt 100 mills. Each.. .... 0 5 0
- AMERICAN TRANSMITTERS.—20 watt, plug-in band type; CBY 52063A. Phone or C.W. valve line-up; 2 89's into 2 837's. RF meter, etc. To be late is to be left! .. Each 6 0 0
- HAMMARLUND TUNING UNITS.—M.O. and P.A. Stages; full of condensers suitable for rig. Can be split statored. In small rack size container. Reduced to] /... .... 3 0 0
- EARPIECES.—High Impedance, 1000 ohm American type. Each 0 5 0
- TRANSMITTERS.—A.T.5, 50 watt, Phone or C.W. crystal or V.M.O. Tube line up; 6V6 Osc., 807 Doubler, 2 807 in final. Ideal Ham Rig, covering 20, 40, 80 metres. Also Broadcast Band to 150 Kc. Meter for all stages; easily adapted to A.C. or D.C. power supply. (And we have Cheaper Models. Write us your Requirements.) 8 0 0
- CARBON MICROPHONE INSERTS.—New. Each 0 2 0
- TRANSMITTER.—V.H.F.; easily adapted for 400 M/c. Band. Uses 2-15E's, in final. Trombone Antenna. Each 3 0 0
- LOW IMPEDANCE HEADPHONE LEADS.—Standard Length. Each 0 1 0
- STANDARD NOTES FOR WIRELESS MAINTENANCE MECHANICS. Including Bendix, A.T.5, A.R.8, etc. Each 0 5 0

SEE OUR VAST RANGE OF CONDENSERS, METERS, FILTER CHOKES, RESISTORS (Variable & Fixed).

NEW VALVES LOW PRICES

807's	10/-	1K4	10/-	VR102	7/6
AV11's	10/-	1P5	10/-	VR92 Diode	7/6
6V6's	10/-	OA4	10/-	VR122	7/6
6J5	10/-	879	10/-	VR21	7/6
12J5	10/-	12SQ7	10/-	VR65	7/6
6SH7	10/-	EF50	7/6	VR66	7/6
6H6	10/-	VR91	7/6	VU139	7/6
3B24	10/-	VP41	7/6	VU111	7/6
1J6	10/-	VS68	7/6	VU39	7/6
1A5	10/-				

LOW PRICES NEW VALVES

HAM RADIO SUPPLIERS

16 Swan Street . . . Richmond

Phone: JA 3827. **After Hours: Haw. 4465.**

SPECIAL ATTENTION GIVEN TO COUNTRY MAIL ORDERS.

DESIGNING A V.H.F. TRANSMITTER

(Continued from Page 9)

For those who like to work to a definite circuit, Fig. 3 is provided and details are given of component values. The circuit is suitable for CW or telephony operation—with the latter, the usual method of simultaneous anode and screen modulation of the final valve should be employed.

Several modes of operation are possible, the following being examples:—

Crystal	6V6 Anode	1st half 832	2nd half 832	Final Output
6.25 Mc.	12.5 Mc.	25 Mc.	50 Mc.	50 Mc.
7 „	14 „	28 „	56 „	56 „
6 „	12 „	24 „	48 „	144 „ (Trebler)

In the latter case, the final valve in Fig. 3 would be used as a power trebler, although it would be better practice to add a further double tetrode as a straight-forward power amplifier.

If a VFO is substituted for the crystal oscillator, it should be arranged to give an output over the frequency range 3 to 3.75 Mc., the 6V6 in Fig. 3 then acting as a frequency doubler. In this case, the tuned circuit in the cathode of the 6V6 will of course be omitted. By simply changing the final anode coil, it will then be possible to cover both bands—50 and 144 Mc.

Experiments have been carried out on the final anode circuit on frequencies in the region of 50 Mc. and 144 Mc. In neither case was any real benefit obtained by the use of linear tank circuits, using copper tubes, etc., provided the smallest possible amount of tuning capacity was used at C in Fig. 3. It is surprising how large a coil is required with double tetrode valves—up to 6 turns of 2" diameter on 50 Mc., and 3 turns 1½" diameter on 144 Mc.

More attention than usual should be paid to by-passing and to reduce the inductance and impedance of wires carrying RF currents, copper strip ¼" wide should be used instead of wire. Such strip, if not readily obtainable, can be cut from a sheet of foil.

Further, the usual precautions of keeping all leads very short, and of using one common earthing point per stage, should be observed.

AERIAL COUPLING Co-axial feeder or balanced line is obviously the best method, at these frequencies, of transferring the RF energy to the aerial. A single coupling loop, with ceramic bead insulation, arranged at the centre of the tank coil, and taken to a suitable plug or socket, is usually all that is necessary. A small relay, totally enclosed in a metal box, should be used for changing over from transmitter to receiver. The cable links between the aerial relay box and the gear should be of an electrical length (usualy two-thirds of the physical length) equivalent to either one or three quarter wavelengths.

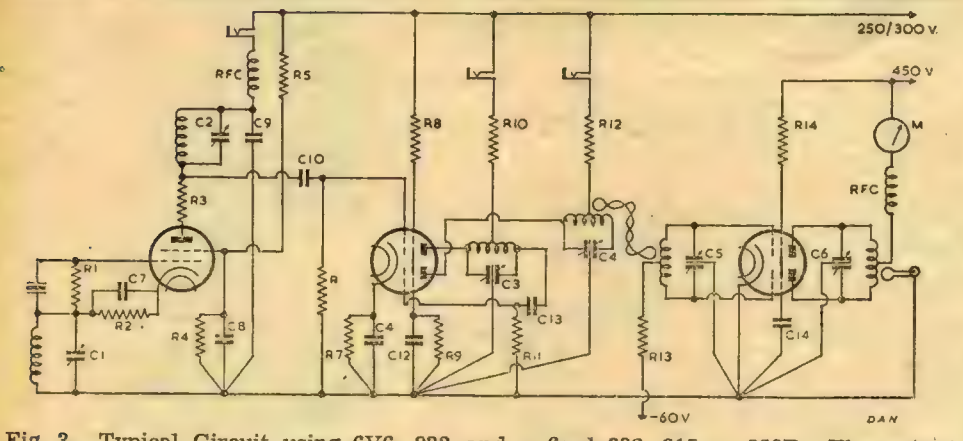


Fig. 3.—Typical Circuit using 6V6, 832 and a final 832, 815 or 829B. The output frequency can be arranged for 50, 60 or 144 Mc. Two 6V6s can be substituted for the first 832.

C1—160 pF. variable.
C2—60 pF. variable.
C3—25 x 25 pF. variable.
C4, C5, C6—15 x 15 pF. variable.
C7, C8, C9—0.002 uF.
C10, C13—50 pF.
C11, C12, C14—500 pF.
R1—100,000 ohms, 1 watt.
R2—200 ohms.
R3—12 ohms.
R4—33,000 ohms, 1 watt.
R5—20,000 ohms, 1 watt.
R6, R11—47,000 ohms, 1 watt.
R7—250 ohms, 3 watts.
R8—5,000 ohms, 3 watts.
R9—15,000 ohms, 3 watts.
R10, R12—470 ohms, 1 watt.
R13—1,000 ohms, 1 watt.
R14—7,500 ohms, 5 watts.
M—100 Ma. Meter.

AN IDEA

If you have a crystal holder with flat plates and both your crystal frequencies are jammed—try putting the two crystals in the holder together—you'll often get a new useful frequency in the band. I've seen it work.—VK5RX.

* * * * *

Have you ever heard Ginger Rogers calling "CQ" on the talkies. The good folk at a local theatre did, anyhow; trouble was that she signed off VK3GE so George had to take the kick!

Australia's Largest Stock of

All Radio Components

Chokes
Coils
Condensers
Dials
Intermediate Transformers
Morse Equipment
Potentiometers
etc., etc.
Resistors
Soldering Irons
Speakers
Test Equipment
Valves
Pick-Ups
Power Transformers
etc., etc.

Obtainable from

Bloch & Gerber Ltd.

with which is associated the

WELDON ELECTRIC SUPPLY CO.

46-48 YORK STREET, SYDNEY

G.P.O. Box 2282 M
Phones: MA 6291 (10 lines)

McGILL'S (Est. 1860)

OVERSEAS AND LOCAL POPULAR MAGAZINES OBTAINABLE ON SUBSCRIPTION.

AMERICAN . . .

Audio Engineering, £1/6/-; C.Q., £1/6/-; Communications, £1/2/6; Electronics, £5/6/-; Popular Science, £1/5/-; Popular Mechanics, 27/-; Q.S.T., 33/6; Radio News, £1/12/-; Radio Electronics, £1/9/6; Science Digest, £1/4/-; Science and Mechanics, 17/6; U.S. Camera, 24/-.

ENGLISH and AUSTRALIAN . . .

Australian Radio World, 10/6; Amateur Radio, 6/-; Electronic Engineering, £1/12/6; Radio and Hobbies, 12/-; Radio and Science, 12/-; Shortwave Magazine, £1/7/6; Wireless World, £1/5/-; Wireless Engineer, £2.

(Add exchange to country and interstate cheques)

Large Range of Technical Books, Stationery and Novels on Display.

Mail Orders by Return Post.

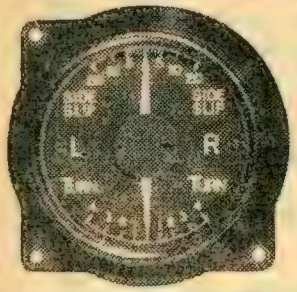
McGill's Authorised Newsagency

183-185 ELIZABETH STREET, MELBOURNE, C.1., VICTORIA.

(The G.P.O. is opposite) **M 1475-76-77**

VICTORIA'S LEADING DISPOSALS MART

Aircraft Instruments—Radio—Large Stocks—Bargain Prices



Turn and Bank Indicator, 15/-
Postage—Vic. 2/-, N.S.W., S.A., Tas. 3/- Qld,, W.A., N.T. 4/-

SPOTLIGHTS
Ideal for fishing, shooting, hunting, camping, etc. Price 17/6
Spare Globes, each 1/6
Postage: Vic, 2/-; NSW, SA, TAS, 3/-; WA, QLD, NT, 4/-.

DOUBLE-SCALE "POCKET" VOLTMETERS
Accurate, 0-15, 0-250. Price 25/-
Postage: Vic, 1/6; NSW, SA, TAS, 2/-; QLD, WA, NT, 2/6.

DON 5 BRAND NEW ARMY TELEPHONES
Used same as P.M.G. Phones. Ideal for House to House, Room to Room, house to shed, etc. No technical knowledge required to install. Price £3/19/6
Postage: VIC, 3/6; SA, NSW, TAS, 5/9; QLD, WA, NT, 8/-.

SPEAKERS
6 in. Permag. Speakers, including 5000 ohm input transformers £1
Postage: VIC, 2/-; NSW, SA, TAS, 3/-; QLD, WA, NT, 4/-.

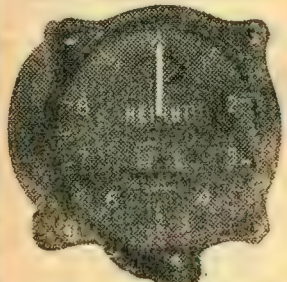
CHARGING GENERATORS
12 and 24 volt 42 amps suitable for engine-driven lighting plant. Price. £10/10/-.
Rail: VIC, 4/-; NSW, SA, TAS, 5/6; QLD, WA, NT, 6/9.

BOOKS . . . RADIO BOOKS

Wireless Direction Finding, by Keen. Cost 27/6. Our Price	6/6
The Cathode Ray Tube at Work, by Rider. Cost 23/6. Our Price	10/-
High Frequency Thermionic Tubes, by Harvey. Cost 37/6.. Our Price	8/6
Ultra High Frequency Technique, by Brainered, Woodruff Kickler. Cost £3/2/-. Our Price	22/6
R.A.F. Notes for Wireless Mechanics	5/-
Inman's Nautical Tables	9/6
Air trategy, by MacMillan	1/6
Your Wings, by Jordanoff	7/6
"Flight," by Wright	6/-
Win Your Wings, by Twiner (2 vols.)	20/-

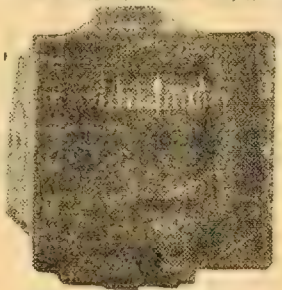
Postage: 1/3.

METERS
Ammeters 0-1 R/F 25/-
0-.35 Amp. 25/-
0-1.5 Amp. R.F. 2 in. Weston . . 25/-
0/2 Amp., R.F. 2 in. Weston . . 25/-
0/50 M/A 25/-
0-50 M/A 25/-
Postage: VIC, 1/6; NSW SA, TAS, 2/-; QLD, WA, N.T. 2/6



ALTIMETERS, £3/10/-
Postage—Vic 2/-; N.S.W., S.A. Tas. 3/- Qld., W.A., N.T. 4/-

8-day ELGIN Clocks, accurate £5. *Postage—Vic. 2/-, N.S.W., S.A. Tas. 3/- Qld., W.A., N.T., 4/-*



Directional Gyro, £3/10/-
Postage—Vic. 2/-, N.S.W., S.A. Tas. 3/, Qld., W.A., N.T. 4/-

Mail Orders Carefully and promptly despatched

WALTHAM TRADING COY. PTY. LTD.

393 FLINDERS STREET, MELBOURNE, C.1. Phone—MB 2701

100 YARDS FROM FLINDER ST. STATION **ENTIRELY RETURNED SOLDIER FIRM**

WHEN ORDERING BY MAIL ORDER PLEASE GIVE NEAREST RAILWAY STATION, POSTAL ADDRESS AND STATE.

TIME MARCHES BACKWARDS

BY WARWICK W. PARSONS*, VK5PS

Just recently I was fortunate to come upon a copy of the one-time official organ of the W.I.A. (S.A. Division), to wit, "The South Australian Wireless and Radio." The copy was dated 1st October, 1924, and the feeling of nostalgia which crept over me as I perused the pages prompted the thought that some of the paragraphs might prove entertaining to others.

Page one had in bold type "Will It Last? Is it (radio) just another craze that will pass?" The editor has no doubts about it, because he says in reply "That radio will last is as certain as the sun shines. It will do more than last. With improvements being reported every day, radio will perform such a public service that it will become one of the necessities of everyday life." (How true these words have been borne out would probably astonish even such an optimistic gentleman as the editor appeared to be.)

Our old friend static was in evidence on page two because 5BG (Harry Kauper) is reported as saying "Loop aerial sets will be necessary to pick up long distance stuff now that summer has set in." He also naively remarks, "It is no good cursing the local broadcasters for broad tuning if you are using a single circuit in your receiver." In fact he doubts if a double circuit would do much good either. (I seem to have heard that one lately too.)

Page five throws a spanner in the works: "The boom begins, Amateurs anxious about transmission rights . . . Radio is moving fast, on all sides enquiries are coming in from Amateurs concerning the right to transmit . . . Among the old hands who listened in with experimental licences are many who have a keen desire to transmit . . . As a matter of fact, queer call signs are frequently picked up which suggest that experimenters are already on the job. (Naughty boys.) The licence fee to transmit is given as five shillings per annum, and most Hams thought this a bit tough." (I wonder what they would think now?)

The sixth annual general meeting was held on 3rd September at the University of Adelaide, and a full report appeared on page seven. The President, Mr. R. B. Caldwell stated, "Regulations in the past have not been very liberal as far as the Radio Amateur is concerned, and I can quite imagine the Amateur of the future being asked to pass a highly technical examination, do a test of 30 or 40 words per minute in morse code, and then being licenced with a maximum power of five watts to transmit on the air between 2 a.m. and 4 a.m. by special permission of a J.P. (You beaut.) He also was slightly off the target with "Regarding broadcasting as at present defined, I am inclined to the feeling that it is not going to be the success, nor the revenue producing concern that some people anticipate." However he was credited with a bullseye when he said, "The future of the Amateur will depend in a large measure upon union among themselves, and it behoves us to court all wireless clubs to affiliate with the Institute, so that a united front may be presented should the rights of the Amateur be assailed." (Words just as applicable then as now.)

A list of Amateurs in VK5 was on page nine and several stalwarts were listed even then. 5AC (Roy Cook), 5AH (Freddy Williamson), 5BF (Frank Miller), 5DA (Roy Buckerfield), 5BN (Hal Austin), also a guarded mention of a "pirate" being heard often. (Probably 5JS or 5LW!!)

On page ten is a letter of thanks from a reader to 2FC for shutting down between 9 p.m. to 10 p.m. to permit listeners to try and tune in to KGO. It says "A fine gesture 2FC." (Couldn't you see a broadcasting station doing that these days?) Page 10a states, "You cannot beat a crystal set for good reception. Four pounds for a set with headphones and a Government licence will give you the most fascinating entertainment imaginble."

Page eleven reports, "In opposition to the time signals, a new spark station has come to light with genuine doots and darshes at any old time between 9.35 and 9.45 p.m." (Bring me the absorption meter Jeeves!) Also on this page was "Removing the slider contact on his receiver, an Amateur at Wallaroo overheard two ladies talking on the telephone." A telegraph messenger at Berri "picked up California on his home-made set and became so excited that he dropped the receiver and hopped off to see a friend." (Must have dropped the receiver on one of his big toes.)

Page fifteen carries details of a meeting of the West Suburban Radio Club and several members' names bear a familiar ring. The Quorn Radio Society also held its first meeting amid great enthusiasm. The Subiaco Radio Club also held a special demonstration illustrated by lantern slides. On page eighteen I notice that a Mr. L. Deane (Tusmore Park) asks how many turns he will require to receive Sydney and Melbourne. He is using a dull emitter valve. (You little devil Launce, playing around with a dull emitter valve, it might have gone off Pop, Pop.) Page twenty lists Interstate Hams who are putting in good signals into VK5. The following get the palm:—2RJ, 2HM, 2GQ, 2YI, 3PR, 3EF, 3RY, 3BU, 4AN on c.w. and a VK6 call sign unknown.

Page twenty-two headlines the fact that a young Amateur 5DA (Roy Buckerfield) had succeeded in contacting America on 90 metres, and this is claimed as an Australian record. It says, "Roy started off with a modest CQ but no reply was received, after five calls U6AKW came back." (Was the fifth CQ a very immodest one Buck?) Page twenty-four had a local "menace" who gave a very amusing write-up on the doings of the boys, and one example is priceless, "Radio Amateur Station 5BN (who incidentally is our President today, 5AW), it is stated, has recovered from a burnt out transformer, and is about again. His music is very nice to listen to now, especially from the new tone arm." (Did you suffer much Hal, from the burnt out tranny?)

Well fellows, there was quite a lot more in the same strain, but I think I have taken up enough of the editor's, and your time. A lot of water has flowed under the bridge since then, and we have improved in the art tremendously, OR HAVE WE? Anyhow, never let us forget the debt we owe to the pioneers of Amateur Radio, which is still the grandest hobby ever.

* Divisional Sub-Editor, 483 Esplanade, Henley Beach, S.A.

THE BEST VALUE IN VK

Modern, Attractive

QSL CARDS

YOUR DESIGN or OURS

Write

FRANK MAHER

209 Melville Road

Pascoe Vale South, Victoria

Interstate Orders Accepted

Resurrecting an L.M. Type Bendix Frequency Meter

BY J. C. DUNCAN*, VK3VZ

During the past two years quite a number of Bendix Frequency Meters have appeared on the disposals market. These Instruments are of two main types, BC221, which has a self contained battery supply in a compartment under the Meter, and the type LM which is much smaller and depends on an external d.c. supply for its power. In addition the LM type can be modulated from an audio oscillator contained in the unit.

Both types of Frequency Meter have a very similar system of calibration, having a reference book which gives the frequency for each reading of the dial, the accuracy of the Meter being ensued by a built in 100 Kc. oscillator which beats against the variable oscillator and provides a number of check points throughout the spectrum. The variable oscillator is made to agree with the check point in the book by varying the small corrector dial on the front panel, which is simply a small trimmer across the main tuning circuit.

The big catch is that these Frequency Meters no sooner hit the shelves when they are snapped up, and unless you happen to be on the spot you miss out, and it is for the benefit of we unfortunates that this article is written, because the only Frequency Meters which remain on the shelves are the ones which have lost their calibration books and are therefore shunned by all.

The writer came upon one Meter recently, which was in such a plight, and was purchased for a very much reduced amount, with some fear, as might be realised, that we had "bought a pup." However after some experimenting it was found that the frequency range of 3.2 Mc. to 4.0 Mc. was straight line, and a system of calibration was devised which enables the frequency to be read directly from the dial calibrations.

It is a well known fact that if the lumped capacity across a tuned circuit is varied, the spread of the main tuning capacity can be spread or contracted at will, which gives us a means of altering the coverage. If the lumped capacity is increased the spread of the main condenser will be decreased, and visa versa. Therefore if we decrease the value of the lumped capacity across the tuning circuit of the Frequency Meter slightly, the main tuning condenser will contract so that 100 degrees will equal 50 Kc., instead of 101 degrees as originally.

When this is done, each degree on the dial will equal 500 cycles on 3.5 Mc., and as the error is no greater than 0.6 of a degree from 3.2 to 4.0 Mc., very accurate frequency checks are obtained, reading directly from the dial. The change necessary in the lumped capacity of the tuned circuit is made on the small adjusting trimmer under the dust cover, located to the right of the corrector condenser, marked "H."

The alterations to the Frequency Meter were made as follows: It is most essential to have an oscillator on 100 Kc. which will give check points to enable the meter to be set up. This can be made quite simply by using a pie wound 7 mH. r.f. choke, and taking the cathode tap from between the pies. A standard broadcast condenser, with a small trimmer in parallel for fine adjustment, will be necessary, and it would be as well to see that the oscillator does not suffer from hand capacity effects. A broadcast receiver which has the broadcast stations marked, and also 100 Kc. points, will give a rough indication of frequency, provided the stations come in on the dial calibrations. After a rough setting has been made, zero beat on a broadcast station on a multiple of 100 Kc. or WWV, and check on the WWV transmissions on 5, 10 and 15 Mc., at a time when audible. If the oscillator is zero beating on all these frequencies, it will be on 100 Kc. The capacity required will be 362 pF. with the 7 mH. choke (RCS type 85).

Tune the 100 Kc. signal in at 3.5 Mc. on the station receiver, and zero beat the Frequency Meter. Note the dial reading, with the corrector at centre scale, then rotate the Frequency Meter dial two revolutions, and zero beat on the next 100 Kc. point (3.6 Mc.). On the writer's Frequency Meter this was 2 divisions more than the first point noted. This indicates that the main dial is spreading slightly more than required, and the amount of fixed capacity across the tuned circuit must be reduced slightly. The dial of the Frequency Meter is retuned to 3.5 Mc., and then turned about 10 divisions lower in frequency. The trimmer under the cover marked "H" on the front panel is altered by a screwdriver to bring the 3.5 Mc. signal back to zero beat, which is in effect lowering the capacity of the trimmer by a slight amount. Again take a reading and rotate the dial two revolutions to 3.6 Mc. The zero beat on 3.6 Mc. should now be nearer to the first reading taken on 3.5 Mc.

After a few tries, a setting will be found on the trimmer where every two revolutions of the dial will equal exactly 100 Kc. Then work between 3.5 and 4.0 Mc. for 10 revolutions, which will give a more critical adjustment of the trimmer for the ends of the range required. A check each 100 Kc. between the points mentioned above will show that each 100 Kc. point occurs at the same reading on the dial, every two revolutions, with an accuracy of half a division. As every division is equal to 500 cycles, this is sufficient for our purposes.

It is not advisable to feed the 100 Kc. oscillator into the Frequency Meter, and listen to the beats with the headphones plugged into the meter itself, because the harmonics of the two oscillators will beat together and give a series of heterodynes which will cause confusion. Far better to use a receiver and avoid this source of error. In the writer's case it was found that when 3.5 Mc. came in at 3411 divisions, the 100 Kc. points were aligned correctly, as described above. As these meters are accurately matched, it would be a good plan to set 3.5 Mc. to this reading, and the readings may be sufficiently close to use as a starting point.

The three grub screws on the dial were taken out, and the calibrated dial plate removed. It will be found that one of the three holes in this plate is in line with the zero mark on the dial. Three holes, of the same size must now be drilled in new positions, so that zero on the dial will come where 11 divisions came previously in my case. This is easily done by laying a steel rule across the dial face, and using the calibrations on the edge of the dial to determine the new position of the hole. The other holes are then marked 120 degrees apart with a protractor. It is essential that care and accuracy be taken in the drilling of these holes, and their marking and centre punching beforehand, to ensure that the dial will read exactly zero, with 3.5 Mc. zero beating on this Frequency.

It may sound complicated but actually is quite simple provided care is taken, and every step checked before proceeding to the next one. The drum dial was then shifted so that it read 35 instead of 34 when on 3.5 Mc. This dial will then show each 50 Kc. point on the fundamental. In practice it is easier to work the frequencies from 7 Mc., as each drum dial division is then 100 Kc., and the smaller dial 1 Kc. Multiply the reading by 2 for 14 Mc., and 4 for the 28 Mc. band, and divide by two for the 3.5 Mc. band.

A check point will be obtained at 3.5 Mc. from the in-built 1,000 Kc. oscillator, when the second harmonic of the variable oscillator beats with the seventh harmonic of the crystal. The corrector dial is then adjusted to make zero beat occur at 0 degrees on the main dial.

Power Supply.—A small power supply was built on the rear of the cabinet, and a metal cover made to enclose it, this cover being fixed with self tapping screws to the sides of the cabinet.

The 12 volts a.c. was obtained by putting the 5 volt and 6.3 volt windings in series on the power transformer, and taking the filament of the 6X5GT rectifier from the 6.3 volt section of the winding only. An octal socket and plug were substituted for the 5 pin socket originally on the unit.

* Technical Editor, 23 Parkside Avenue, Balwyn, Victoria.

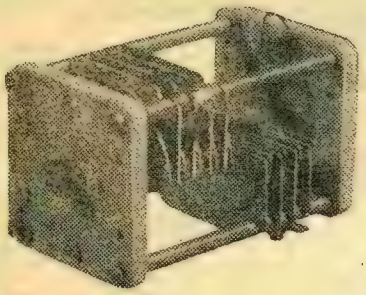
Use the best components and you'll get the best results!

That's why experienced "hams" always use

EDDYSTONE

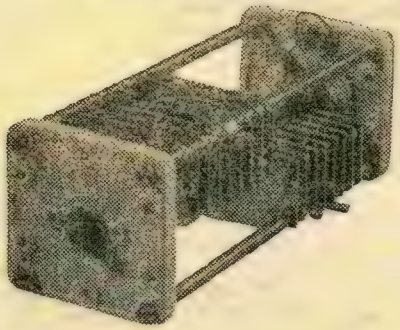
TRANSMITTING CONDENSERS

● NOW AVAILABLE AT THE NEW REDUCED PRICES



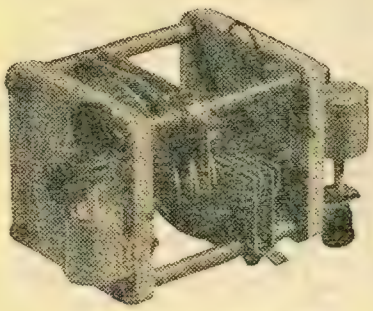
Cat. No. 612 . . . 50/9

This is a split stator condenser of rigid construction and fitted with ceramic end plates 2½" square. Maximum capacity per section is 50 pF, and the vane spacing is .08". It is very suitable for use in amateur transmitters working on frequencies in the 28 and 14 megacycle bands.



Cat. No. 614 . . . . . 58/3

Identical to Cat. No. 612, except that it is longer and has a capacity of 100 pF per section, making it suitable for the lower frequencies.



Cat. No. 611 . . . 57/-

Of similar construction to Cat. Nos. 612 and 614 and a capacity per section of 25 pF. Two neutralising condensers having a variation of from 1.5 to 7 pF are integrally built-in, one at each end, and lugs are fitted for direct connection of the tank coil. The whole assembly is ideal for use in a medium power V.H.F. transmitter employing low capacity triodes in a symmetrical push-pull circuit.

DIRECTORY OF DISTRIBUTORS

- VICTORIA: J. H. MAGRATH & CO. 208 Little Lonsdale St., Melbourne
- N.S.W: JOHN MARTIN PTY. LTD. 116-118 Clarence St., Sydney
- Q'LAND: CHANDLERS PTY. LTD. Cnr. Albert & Charlotte Sts. Bris.
- WEST AUST: CARLYLE & CO. LTD. Hay St., Perth & 397 Hannan St., Kalgoorlie
- S.A: GERARD & GOODMAN LTD. 192-196 Rundle Street, Adelaide
- TAS: W. & G. GENDERS PTY. LTD. 53 Cameron Street, Launceston

Australian Factory Representatives:

KEITH HARRIS & CO. PTY. LTD. 51 WILLIAM ST., MELB. Tel. MB2119

RADIO PRODUCTS EDDYSTONE TRADE MARK

EDDYSTONE OFFERS YOU THE LATEST, *MOST DEPENDABLE* COMPONENTS for FM., AM., & PULSE

BUILD YOURSELF A BRIDGE

BY STEVE GRIMSLEY*, VK3ASG

A "MUST" for the shack—here is a simple LCR bridge with a thousand uses for the Amateur and Serviceman.

How many times in building up an item of gear does one pick up a component and say, "I wonder if this will do the job?", or "I wonder what capacity range this condenser covers?" That happens to me so often, and so many parts have to be restored to the junk box unused because their values are an unknown quantity, that I decided to make up a bridge.

Remember the Wheatstone bridge circuit? Basically, here is the idea. As in Fig. 1a four resistances are connected in series-parallel to a voltage source, E, and a galvanometer connected between points X and Y in the network. If—

$$\frac{R_1}{R_2} = \frac{R_3}{R_4},$$

then there will be no reading on the meter, as the voltage drop across R_1/R_3 and R_2/R_4 is identical, and consequently no potential difference will exist at points X and Y. When this condition exists, the bridge is said to be "balanced." Now if R_3 is a variable known resistance, and calibrated, then R_4 can be replaced with an unknown value, and the bridge brought back into balance by adjusting R_3 till there is zero reading on the meter. The value of R_4 is then ascertained from the R_3 calibration.

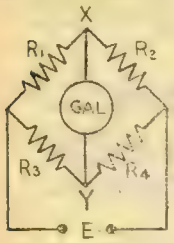


Fig. 1a.

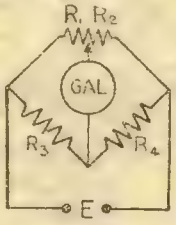


Fig. 1b.

A form of bridge in which the ratio arms (R_1 and R_2) are continuously variable, is known as the "Slide-Wire" Bridge, and is a more convenient form of the Wheatstone Bridge for our purpose. This circuit is illustrated in Fig. 1b. The balance is achieved by solving the same equation, viz.—

$$\frac{R_1}{R_2} = \frac{R_3}{R_4}.$$

However, the standard does not have to be variable, thus range selector switching is more readily possible, and the ratio arms can be made common to all ranges.

By substituting an audio tone for the voltage source, E, a pair of headphones may be used instead of a meter, for the zero or "null" indicator. As this arrangement may be used with capacity or inductance forming the standard arm of the bridge, we have the makings of an instrument with decided possibilities.

And so to our bridge. With this bridge a good range of useful values is covered, it is extremely simple to build, it is economical in cost (surely a redeeming feature!), and it is fairly accurate provided that reasonable care is taken in its construction.

The circuit of the bridge is shown in Fig. 2. By switching in the standards indicated, the ranges of the bridge are: Resistance—10 ohms to 0.8 megohms; Capacitance—10 picofarads to 0.6 microfarads; Inductance—30 microhenries to 30 millihenries. These ranges may vary slightly with individual instruments.

On range F, an external standard may be used and graph calibrated to extend these ranges to suit individual requirements. However, the ranges provided seem to be those needed most, in my own case at least!

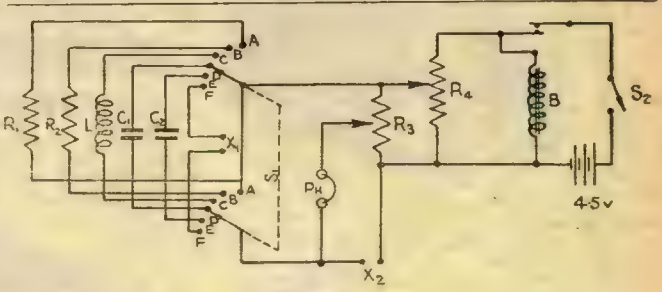


Fig. 2.

C1—450 pF. Mica.
C2—0.005 uF. Mica.
R1—3,000 ohms.
R2—25,000 ohms.
R3—10,000 ohms, W.W. Pot.
R4—0.5 meg., Vol. Control.
L—2.5 mH. R.F. Choke.
B—Buzzer (high pitch if possible).
S1—Two pole six position.
S2—S.P.S.T. Toggle.
PH.—2,000 ohm Phones.
X1—External standard terminals.
X2—Test leads for unknown.

The physical construction of the bridge is shown in Fig. 3. The battery switch, headphone jack, external standard terminals and test leads, are located on the rear panel of the unit. The box may be made of almost anything—iron, aluminium or wood. The panel can be ebonite, bakelite, plywood, masonite, metal, or "what have you." But please—insulate that potentiometer and phone jack!

The potentiometer and range selector switch are mounted on the panel in a central position, each 3 inches from the ends of the panel, with the potentiometer on the left. The resistor strip bearing the five standards is mounted on the rear of the panel, over the selector switch. If not already provided, file a "flat" on the control shafts so that the knobs cannot shift. Imagine the mess if your potentiometer knob shifts after the bridge is calibrated! Use a knob with two grub-screws if one is handy. Fix a celloloid pointer to this knob—fix it permanently—and mark the pointer with a black ink hairline. The scale is merely a 5 inch circle of good quality drawing paper, glued flat and fixed to the panel with three "self-tapping" screws. This dial is divided into six circles, five for direct calibration, and the outer for a convenient scale of numbers to use in conjunction with graph calibrations and external standards. The scales are marked A, B, C, D, E and F, and the selector switch likewise. Make your test leads of heavy but flexible wire, keep them short, and furnish them with a pair of strong crocodile clips or similar.

The internal standards need not necessarily be very accurate. Any parts of reputable manufacture will do. However, the components used to calibrate the instrument should be as accurate as possible, of good quality and with known low tolerance.

The method of calibrating the bridge is no doubt obvious to those fellows who (as Henson would put it) have had the perspicacity and good taste to read this article. Switch to range A, connect the test clips to a suitable accurate value, say 1,000 ohms, switch on the buzzer, adjust tone level in phones by means of the volume control, and swing the knob until a dip in tone level to zero is heard. Swing the knob slowly back and forth, to ascertain dead centre of "null." There is quite a pronounced dip at "balance," and the audio should completely cancel. Now mark your A scale with ink at the appropriate spot, and enter the value. Try the same resistor on B range. It may also register there—near the extreme "low" end. Back to range A and parallel your calibrator with another 1,000 ohms. Repeat

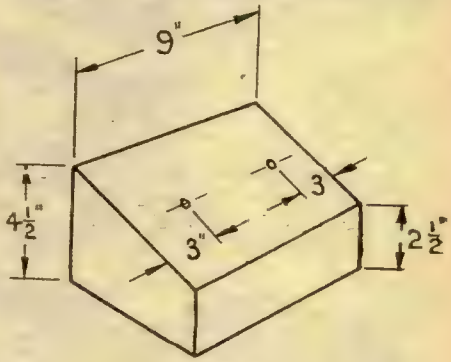


Fig. 3.

* "Starlings," 46 Warrigal Rd., Surrey Hills, E.10, Victoria.

procedure and mark in 500 ohm point on your scale. Now put the two resistors in series and calibrate the 2,000 ohm point. This procedure is used with various combinations until ranges A and B are completely calibrated.

Range C, inductance, is not meant to be a precision range, but will come in very handy in winding or checking RF chokes, large coils, etc. To calibrate, merely use an RF choke of known value, say 2.5 mH., and add several in series. Calibrate the low end by using a "coil calculator nomograph" from you Radio Handbook or similar publication, to ascertain the rough inductance of a coil or two. Ranges D and E are calibrated in a similar manner to ranges A and B, using good quality "ceramicon" mica, and paper condensers.

Resistors and condensers of known value, which fail to show a normal reading on the bridge, may be safely tossed into the waste paper basket.

Incidentally, don't panic when you find that resistor and condenser values increase in opposite directions on your scale. This is normal.

Now go to it—drag out those dusty old variable condensers, and find out their real value!

THE UNITED NATIONS ON THE AIR

At 6 p.m. on the 17th May, 1948, a new Amateur Station went on the air, for the first time. Not very remarkable perhaps, but its call sign, K2UN, is remarkable.

From Lake Success, at the Headquarters of the United Nations, Geo. W. Bailey, President of the International Amateur Radio Union, called CQ and was answered by I1RM in Como, Italy. Then the word got round, and contacts were made with Paris, Wiesbaden, Cuba and Bermuda.

The station has two transmitters, each the full kilowatt of power allowed. One operates on 40 and 80 using doublet antennae, the other on the high end of the American 20 and 10 metre bands, using a rotary beam. The receiver is an H.R.O. No. 7, the transmitters were made by Temco, and a panadapter is used. Transmitters are remote controlled from a broadcasting type table, which has from left to right: transmitter controls, panadapter, the receiver in front of the operator, the beam direction indicator, speaker and VFO.

Why the station has a K prefix rather than a W, is explained by the multiplicity of Ws not leaving them the letters they wanted, so K2UN was allocated, "Come to the United Nations."

It is planned that the station be on the air from 4 p.m. to midnight, American E.S.T.

VK3KG reports what is probably the first VK contact with K2UN, when good reports were exchanged on the 20 metre band. It is hoped by the United Nations Secretariat that the station will "preserve and foster the spirit of fellowship among Radio Amateurs, to promote international interest, and build prestige, for the United Nations."

An Accurate and Inexpensive Wavemeter

BY DR. K. M. KELLY*, VK3ALL

This instrument is much the same as any other Wavemeter, except that it is tuned by a slug, and very accurate readings are possible. It operates on the 3.5 Mc. band, and accuracy better than 250 cycles is easily obtained (or within 1 Kc. on the 14 Mc. harmonic). The whole unit is encased in a metal box, including batteries.

Fig. 1 shows the general assembly of the main "works." This was made with the aid of a lathe. Note how the driving rod is prevented from turning, thereby eliminating backlash.

As shown the unit covers 3.45 to 3.85 Mc., and takes about 10 turns of the 4" dial, i.e. about 10' of dial for 400 Kc.! It is easy to log a station, and later to place the receiver on the same frequency for keeping a sked—even to practically the same beat note on CW!

A harmonic from a broadcast station can be used as a check point, and will give a maximum error of ± 20 cycles, as most BC stations are maintained within ± 5 cycles for greater part of the time.

The circuit in Fig. 2 is straight forward. Headphones are plugged into the jack and a local signal can be heard as a beat note.

A shorted plug can be placed in the jack for accurate measurements—the headphone cords make for slight inaccuracy (although this can be overcome by using an audio transformer to isolate the phones—Ed.).

No external coupling, other than the shorting wire on the plug, is needed to produce a signal in the average receiver.

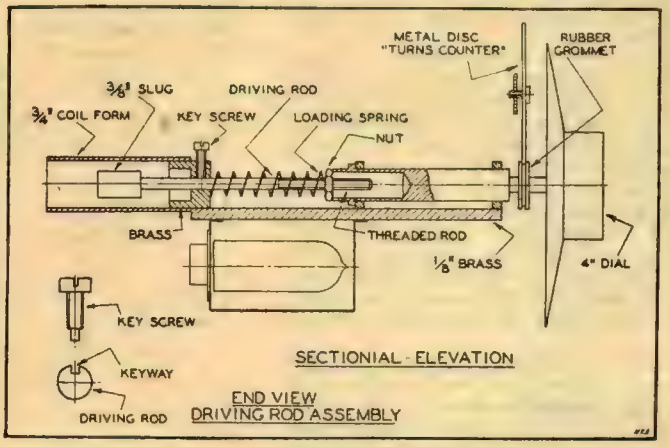


Fig. 1.—Section Drawing.

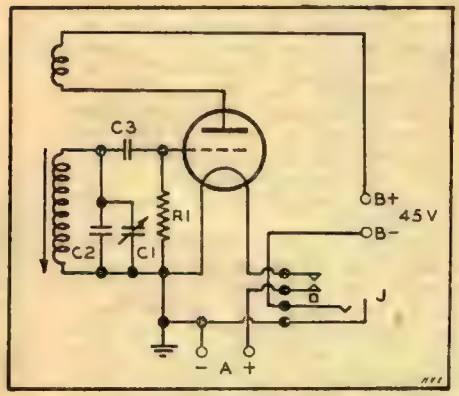


Fig. 2.—Circuit

C1—Zero Set, 2 Plate Double-Spaced, Variable.
C2—500 pF. Silvered Mica.
C3—100 pF.
R1—60,000 ohms.
L—Variable Inductance to suit band required.
J—Fil. Control Jack.

*C/o. the Vice Chancellor's House, University, Carlton, Victoria.

IMPROVED 144 Mc. RECEPTION

Owners of the SCR522 can make a substantial improvement in receiver performance by the use of the regular station communications receiver in the same manner that the "Q5-er" is used on the lower frequency bands.

The communications receiver is used as an additional i.f. amplifier and audio channel. It is loosely coupled to the last i.f. transformer of the 522 by twisting a wire once or twice around the lead that runs from the last i.f. transformer of the 522 to the 12C8 detector tube. The other end of the wire is connected to the antenna post of the communications receiver. The communications set is then tuned to about 12 Mc., the i.f. frequency of the 522.

Rough tuning is accomplished with the dials of the 522 in the usual manner. Then the band spread dial of the communications receiver is used for peak reception.

This system of reception offers all the convenience of low frequency operation: stable easy-to-read signals, bandspread tuning, S-meter, b.f.o., noise limiter action, and a better audio system. Most important, however, is the improvement in signal-to-noise ratio obtained because of the narrower passband of the system. Unstable or badly-drifting signals can be received as usual on the 522 alone by turning the audio gain of the 522 up, while reducing it on the low frequency set.—QST, Sept., 1948.

IN SEARCH OF A KEYED V.F.O.

BY E. M. WADDLE*, VK4GZ

In various radio publications in the past there has been described Variable Frequency Oscillators which the authors claim could be keyed without any chirp or click being heard when the V.F.O. was coupled to the transmitter.

As the need for a really good V.F.O. on the present over-crowded Ham bands is essential, it was decided to duplicate one of the articles, and thus obtain the claimed for results. Or so we fondly believed.

In the course of the quest for a chirp free V.F.O. six types of oscillators were tried, ranging from the simple triode to push-pull low frequency jobs. All of these had good stability—until they were keyed—then chirps and keyclicks were evident in the monitor. It should be mentioned that in all cases except the very low frequency oscillators, the fundamental was 3.5 Mc. followed by an untuned isolator stage, and tuned amplifier on the same frequency. Doubling was accomplished in the main transmitter.

If one of the stages of the transmitter was keyed there was no trouble with any of the oscillator circuits. However as break-in was the ultimate aim here, a good stable V.F.O. that could be keyed just had to be found.

In the English "Wireless World" there appeared a cathode coupled oscillator using two 6V6 tubes. The advantage of this type of oscillator circuit over the others is the ease of adjustment. No taps are needed on the coil, thus eliminating the main source of instability when endeavouring to obtain a T9 note from a keyed E.C.O. oscillator. The position of the cathode tap having a vital bearing on the stability of the note of such oscillators.

This cathode coupled oscillator was constructed, and keyed in the cathode. Chirps were absent, but some key clicks could be heard. No doubt these could have been eliminated by the use of suitable filters at the key, but it was thought that better signals could be obtained from an oscillator requiring no keying filter.

Looking for further information upon this problem an adaptation of the English circuit was found in QST. This had the tuned circuit in the grid instead of the plate as in the other circuit.

With this circuit and using a 6SN7, keying was tried between the grid of the cathode follower section of the tube, and ground. This time success seemed nearer, as only slight traces of chirp and no clicks were present. The stability was excellent.

It was now decided to eliminate the chirp by using a very low voltage on the oscillator and keying the isolator. This proved to be only partially successful. Next a completely new V.F.O. was constructed embodying the lessons learned in the previous experimental models.

* Gill Street, Charters Towers, Qld.

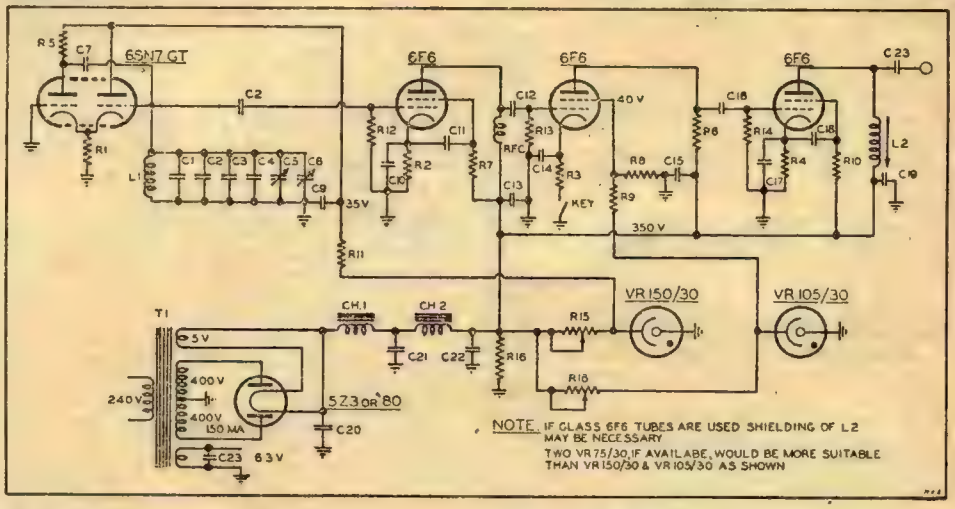
The 6SN7 cathode coupled oscillator was used on 3.5 Mc. with 35 volts from a regulated supply. It was housed in a 7" square metal box of ⅛" steel mounted on 1" rubber cushions and connected to a 7" x 18" x 4" chassis at one point only by a heavy copper strip.

In order to keep stray R.F. from appearing in the receiver when the oscillator is running, all leads into the oscillator compartment are by-passed for R.F. by means of chokes and condensers. This isolation is essential when the V.F.O. is placed alongside the receiver. Too great an emphasis cannot be placed upon the importance of **completely** shielding the oscillator.

Stability of the oscillator was further enhanced by using ceramicons across the coil. Bandsetting being accomplished by the 100 pF., tuning by the three plate midget across the coil. This condenser is mounted on the back wall of the box and connected to the dial by an insulated shaft and coupler.

It will be noticed that the plate load of the second 6F6 is a 3,000 ohm resistor. It was used to prevent the interaction which occurred between the R.F. chokes in the plate circuits of the 6F6 tubes; changing to the resistor cured this trouble.

All the tubes and parts used were those on hand. This accounts for the



C1—250 pF.
C2—40 pF.
C3—55 pF.
C4—30 pF.
C5—100 pF. variable.
C6—15 pF. variable.
C7—0.001 uF. mica.
C8, C12, C16, C23—100 pF. mica.
C9, C18—0.002 uF. mica.
C10, C14, C15, C17, C19—0.01 uF. mica.
C11, C13, C23—0.006 uF. mica.
C20, C21—16 uF. electrolytic.
C22—40 uF. electrolytic, 400 v.
R1—2,000 ohms.
R2, R4—450 ohms.
R3—400 ohms.
R5, R7, R9—0.05 megohm.
R6—3,000 ohms.
R8—35,000 ohms.
R10, R11, R12, R13, R14—0.1 megohm.
R15, R17—10,000 ohms pot., W.W.
R16—25,000 ohms V.D.
L1—17 turns 18 gauge 1½" long, 1" diam.
L2—28 turns 24 gauge, 1¼" diam., tuned with 1" brass slug 3" long.
T1—400/400 at 150 Ma. Power Transformer, 6.3 v. at 3 amp., 5 v. at 3 amp.
CH1, CH2—100 Ma. Filter Chokes.

Following the oscillator were two isolators and then the final amplifier. All of these stages used 6F6 tubes. These were used for two reasons. Firstly they were to hand, and secondly, they have better isolation between the grid and plate than the 6V6. These stages were operated at Class A. The final stage was slug tuned to 3.5 Mc. Keying was accomplished by keying the cathode of the second 6F6.

By means of a resistor network across the output of a 150 volts of regulated supply, the screen voltage was kept down to 40 volts. This produced chirpless and click free keying.

resistance used in series with the VR105 to drop the voltage to 35 for the oscillator, which is definitely not done in the best of VR circles.

It is very important to see that the V.F.O. power supply has a two section filter, and that the capacity used across the chokes is high. This applies to a lesser degree to the supply of the transmitter.

The final slug tuned stage is broad enough to cover the band without adjustment, once it is set for the middle of the band. It is capacity coupled to the grid of a 6L6 in the transmitter by a 100 pF. condenser and a length of co-

ax. Excitation is sufficient with this stage to operate the 6L6 as a doubler to drive 807 to 14 Mc. direct, or as a quadrupler to the same frequency.

After tests were run the oscillator drift was further reduced by reducing the oscillator plate voltage to 22 volts and the heater voltage to 3.3 volts.

A series of tests with about 40 stations, both VK and DX, since the completion of the unit, showed the reports were invariably T9 or T9X. In fact only four stations reported the signal as being T8, indicating that providing you take the trouble a V.F.O. can be keyed without sounding like a bad disposals job.

S.O.S. SPECIALS

Collins V.F.O. Units, 10 to 80 metres calibrated... ...	£26 10 0
IN34 Sylvania Germanium Crystal Diodes	1 5 0
National 50 P.F. Isolantite Variable Condensers	5 0
6AK5 Valves ...	1 10 0
S.O.S. Universal Stroboscopes ...	9
I.R.C. Resistoguide...	1 0
Ohmite Ohms Law Calculators ...	2 6
465 Kc. I.F. Crystals	1 19 6
1600 I.F. Crystals ...	2 5 6

NETT N.Z. CURRENCY

Mail a Money Order now to

S.O.S. RADIO LTD.

283 Queen Street

AUCKLAND, N.Z.

CONTEST NEWS.

VK2 Wins Remembrance Day

The average of the six highest logs for the Perpetual Trophy are as follows:

VK2	....	219.66 Points
VK6	....	199.35 „
VK3	....	183.66 „
VK5	....	142.66 „
VK7	....	120.66 „
VK4	....	110.66 „

Congratulations to the VK2 boys for their fine effort.

The first Remembrance Day was very successful and everyone participating enjoyed it to the full. It is a pity that more stations did not take part, but probably insufficient publicity contributed to this. Eighty-eight scoring logs were received and several check logs. A large receiving log was to hand from Eric Trebilcock and if more listeners were as enthusiastic as he, a listeners' section would be possible.

Many letters were received from participants congratulating the W.I.A. on the spirit behind the Contest. These letters were appreciated and it is hoped that in this, and future, years this Contest will perpetuate the memory of the "Silent Keys" in Amateur Radio throughout Australia.

INDIVIDUAL SCORES

New South Wales

2ZH	245 Pts.	2VA	104 Pts.
2PA	244 „	2YC	89 „
2VN	212 „	2ZX	81 „
2AHA	211 „	2ARH	78 „
2EO	203 „	2HZ	61 „
2RA	203 „	2WD	55 „
2GW	202 „	2OW	52 „
2QL	184 „	2MT	41 „
2CI	174 „	2AKO	35 „
2NY	170 „	2PN	33 „
2OE	153 „	2OV	20 „
2JX	152 „	2HC	16 „
2DO	145 „		

Victoria

3XK	228 Pts.	3BB	85 Pts.
3MC	191 „	3ZC	84 „
3UM	182 „	3VQ	82 „
3YS	181 „	3ADG	73 „
3IG	162 „	3WH	69 „
3AWW	158 „	3AGF	62 „
3BD	155 „	3DS	49 „
3JZ	154 „	3KV	48 „
3XB	153 „	3TX	46 „
3JI	129 „	3ZR	45 „
3DG	118 „	3RJ	42 „
3JE	100 „	3GZ	40 „
3QK	99 „	3YF	33 „
3FF	88 „	3KB	24 „

Queensland

4XJ	169 Pts.	4SN	89 Pts.
4CG	122 „	4HZ	87 „
4NO	102 „	4TB	72 „
4JF	95 „	4AW	36 „

South Australia

5OU	176 Pts.	5HN	83 Pts.
5FX	171 „	5RX	61 „
5KE	152 „	5RK	58 „
5JE	138 „	5JT	56 „
5IW	111 „	5BP	14 „
5RR	108 „		

Western Australia

6RU	284 Pts.	6GA	110 Pts.
6KW	253 „	6WT	98 „
6DX	188 „	6CF	72 „
6FW	182 „	6FA	55 „
6RF	134 „	6DJ	52 „

Tasmania

7AB	205 Pts.	7AL	101 „
7DS	156 „	7SJ	90 „
7OM	142 „	7BJ	30 „

PRIZES IN DX CONTEST

For the 3.5 Mc. Section, an Extension Speaker with adaptor has been allotted. This prize was, by error, allocated to the Receiving Section in last month's list of prizes.

Low Drift Crystals

FOR

AMATEUR BANDS

ACCURACY 0.02% of STATED FREQUENCY

3.5 M/C and 7 M/C

Unmounted .. £2 0 0

Mounted .. £2 10 0

12.5 and 14 M/C Fundamental Crystals, "Low Drift" Mounted only £5.

Spot Frequency Crystals Prices on Application

Regrinds £1 0 0

THESE PRICES DO NOT INCLUDE SALES TAX.

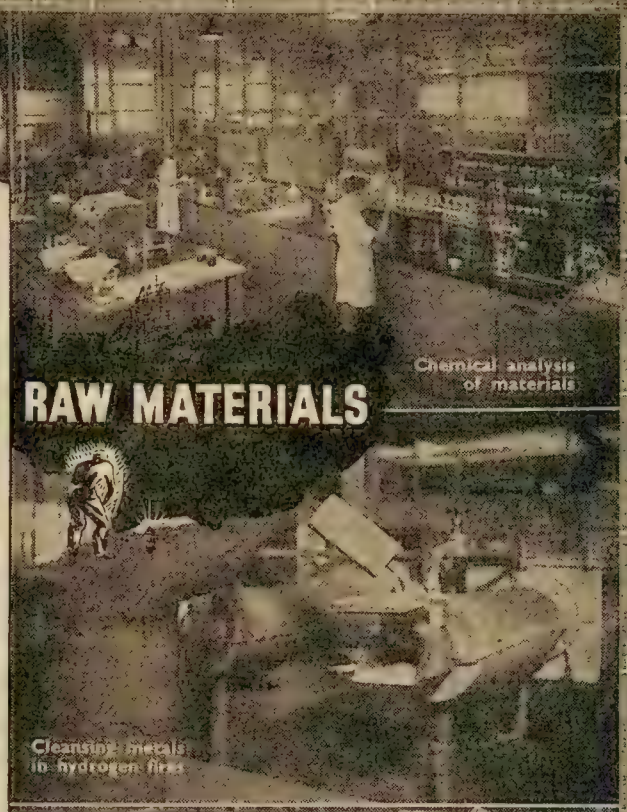
Maxwell Howden

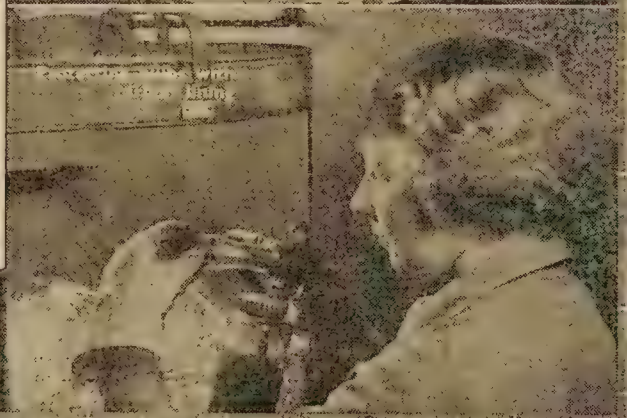
15 CLAREMONT CRES., CANTERBURY, E.7.

Design for quality

- Within the familiar glass bulb of every radio valve, cleanliness and purity of materials rank above all other considerations — a condition achieved only through the application of stringent processes designed to safeguard ultimate performance.

- Chemical analysis, intense heat treatment, protective coating and microscopic examination all combine to ensure that Quality in Radiotron Valves is established in its initial stages of manufacture— that Quality is literally "in built."





AMV Radiotron VALVES MADE IN AUSTRALIA

COMPLETE QUALITY CONTROL

AMALGAMATED WIRELESS VALVE COMPANY PTY. LIMITED
47 YORK STREET, SYDNEY

FEDERAL, QSL and DIVISIONAL NOTES

Federal President.—W. R. Gronow, VK3WG; Federal Secretary.—W. T. S. Mitchell, VK3UM, Box 2611W, G.P.O., Melbourne.

NEW SOUTH WALES

Secretary.—Wal Nye (VK2XU), Box 1734, G.P.O., Sydney.

Meeting Night.—Fourth Friday of each month at Science House, Corner Gloucester and Essex Sts., Sydney.

Divisional Sub-Editor: H. F. Treharne, VK2BM, 5 Waimea St., Burwood.

Zone Correspondents.—North Coast and Tablelands: P. A. H. Alexander, VK2PA, Hill St., Port Macquarie; **Newcastle:** E. J. Baker, VK2FP, 13 Skelton St., Hamilton, Newcastle; **Coalfields and Lakes:** H. Hawkins, VK2YL, 27 Comfort Ave., Cessnock; **Western:** G. J. Russell, VK2QA, 116 Bogan St., Nyngan; **South Coast and Tablelands:** R. H. Rayner, VK2DO, 42 Pettit St., Yass; **Southern:** E. N. Arnold, VK2OJ, 673 Forrest Hill Ave., Albury. **Western Suburbs:** A. C. Pearce, VK2AHB, 48 Harrabrook Ave., Five Docks. **Eastern Suburbs:** H. Kerr, VK2AX, No. 4 Flat, 144 Hewlett St., Bronte. **North Sydney:** L. D. Cuffe, VK2AM, 779 Military Rd., Mosman. **St. George:** J. A. Ackerman, VK2ALG, 32 Park Rd., Carlton. **South Sydney:** V. H. Wilson, VK2VW, Cr. Wilson St. and Marine Pde., Maroubra.

VICTORIA

Secretary.—C. C. Quin, VK3WQ.

Administrative Secretary.—Mrs. O. Cross, Law Court Chambers, 191 Queen St., Melbourne, C.1.

Meeting Night.—First Wednesday of each month at the Radio School, Melbourne Technical College.

Zone Correspondents.—North Western: B. R. Mann, VK3BM, Quambatook; **Western:** C. C. Waring, VK3YW, 12 Skene St., Stawell; **South Western:** B. Sectrine, VK3BI, 17a Raglan Street North, Ballarat; **North Eastern:** J. A. Miller, VK3ABG, "Erinvale," Avenel; **Far North-Western Zone:** Harry Dobbyn, VK3MF, 42 Walnut Ave., Mildura; **Eastern Zone:** J. D. Chilver, VK3DI, 20 Smith St., Leongatha.

WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK2WI.—Sundays, 1100 hours EST, 7190 Kc. and 2000 hours EST 50.4 Mc. No frequency checks are available from VK2WI.

VK3WI.—Sundays, 1130 hours EST 7196 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

VK4WI.—Sundays, 0900 hours EST simultaneously on 7109 Kc., 14342 Kc. and 52.004 Mc. Frequency checks are given two nights weekly, and the hours are announced during the Sunday broadcasts.

VK5WI.—Sundays, 1000 hours SAST on 7196 Kc. Frequency checks are given by VK5DW on Friday evenings on the 7 and 14 Mc. bands.

VK6WI.—Sat 2 p.m. Sun. 9.30 a.m. W.A.S.T. between 7000 kc. and 7200 kc. No frequency checks available.

VK7WI.—Second and Fourth Sundays at 1030 hours EST on 7174 Kc. No frequency checks are available.

QUEENSLAND

Secretary.— G. G. Augustesen, Box 638J, G.P Brisbane.

Meeting Night.—Last Friday in each month at State Service Building, Elizabeth St., City.

Divisional Sub-Editor: F. H. Shannon, VK4SN, M den, via Rosewood.

SOUTH AUSTRALIA

Secretary.—E. A. Barbier, VK5MD, Box 1234K, G.P. Adelaide.

Meeting Night.—Second Tuesday of each month 17 Waymouth St., Adelaide.

Divisional Sub-Editor.—W. W. Parsons, VK5PS, Esplanade, Henley Beach.

WESTERN AUSTRALIA

Secretary.—W. E. Coxon, VK6AG, 7 Howard St., Per

Meeting Night.—Second Monday in each month the Builders' Exchange, St. George's Terra Perth.

Divisional Sub-Editor.—VK6WT, Mr. D. Couch, M Street, Watermans Bay, W. Australia.

TASMANIA

Secretary.—J. Brown, VK7BJ, 12 Thirza St., Ne town, Telephone: W 1328.

Meeting Night.—First Wednesday of each month the Photographic Society's Rooms, 163 Liverp St., Hobart.

Divisional Sub-Editor.—T. Connor, VK7CT, 385 Elizab St., Hobart.

Northern Correspondent.—C. P. Wright, VK7LZ, Knight St., Launceston.

FEDERAL

DX C.C. LISTING

PHONE:

Nil.

CW:

VK3CN	(3)	125
VK3BZ	(14)	114
VK3EK	(10)	112
VK3VW	(12)	111
VK2EO	(7)	103
VK2QL	(13)	101

OPEN:

VK3BZ	(5)	137
VK3KX	(1)	136
VK2DI	(2)	135
VK3HG	(4)	131
VK3MC	(6)	117
VK6RU	(11)	112
VK4HR	(9)	111
VK3JE	(18)	110
VK2YL	(17)	106
VK4EL	(16)	104
VK2AOX	(8)	100
VK2AHA	(15)	100

Figures in parenthesis indicate the membership number to the DX C.C.

Cards from the following stations have been received and are being checked:—VK6KW, VK4DO, VK4DA and VK2ADT.

It has been decided to list in future the number of Zones worked by DX Century Club members. Would the members therefore kindly drop a note to the Federal Secretary mentioning their Zones worked total for inclusion in next month's notes.

REMEMBRANCE DAY CONTEST

Elsewhere in this issue appears the results of the first R.D. Contest. Judging by the number of participants and the logs received, it looks like becoming THE Contest of the year for Australia. It is indeed gratifying to F.E. and the Contest Committee to see so many entries, but there are still a number who did not participate. Please do not hesitate to send in your log as it aids in the checking. Congratulations to New South Wales—the winners! We trust that the interest shown in this Contest augers well for the National Field Day Contest to be held early next year. Watch for the details in December "A.R."

AUSTRALIAN AMATEUR CALL SIGNS

New Issues:—

VK2ABA—F. A. Barry, 374 Victoria St., Darlinghurst.
2ACH—H. O. Hickin, 3 Mount St., Hunter's Hill.
2AGE—I. N. Maclachlan, 75 Weston St., Harris Park.
2AGK—A. B. Girling, Cobbora St., Dunedoo.
2AGP—G. E. Lewis, No. 7 Flat, 14 Kangaroo St., Manly.
2AGT—J. K. Langley, 37 Acton St., Hurlstone Park.
2AIL—K. L. Finney, 73 Eastern Road, Tarramurra.
2ALC—L. K. Connor, 104 The Boulevarde, Lakemba.
2ALD—R. Smith, Soywell Rd., Macquarie Fields.
2AMD—H. V. Booth, Kembla St., Wollongong.
2AMK—L. A. McPherson, 39 Addison Ave., Roseville.
2ANB—N. T. Buchanan, 41 Sir Thomas Mitchell Rd., Bondi.
2ANL—Rev. J. B. Doran, The Presbytery, Lampton.
2APA—C. Allen, 2 Div. Sig. Regt., Moore Park Rd., Paddington.
2ARS—J. J. Gallaghar, 35 Ilka St., Leichhardt.
2ASB—S. E. Brown, The Vale, Pitt St., Manley Vale, Balgowlah.
2ASG—R. O. Chapman, 67 Arabella St., Longueville (Mobile).
2AWL—W. S. Arnold, 4 Terry Rd., Eastwood.
2YI—H. W. Blue, 55 Leura Rd., Auburn.
VK3AAB—A. B. Monk, Railway Cafe, Diamond Creek.
3ACK—J. A. Woodward, Main St., Mooroopna.
3AHL—L. W. Harding, 25 Guthrie St., West Brunswick.
3AKR—K. L. O'Rorke, "Killigrew," Westmere.
3AMF—G. M. Fowles, Halfway House, Ferntree Gully Rd., Wheeler's Hill.
3ARX—C. Serle, 2 The Avenue, Windsor.
3ASM—S. F. Macauley, Lower Bogong, via Wodonga.
3AWH—W. Hampson, 147 Bayne St., Bendigo.
3AWR—W. E. Knapp, 13 Chatham Rd., Canterbury.
3AZH—N. B. O'Brien, Flat 3, 27 Dolphin St., Randwick.
3NZ—R. H. Hall, 36 High St., St. Kilda.
3OD—O. W. Welsh, 14 McPherson St., Nor Horsham.
3OW—C. B. Robinson, c/o. 3LK, Lubeck.
VK4LF—L. B. Simpson, Beatty Rd., Coope Plains, Brisbane.
4LU—D. V. Reynolds, Flying Boat Base, K umba.
VK5DL—D. A. Crowley, 24 Parade, Norwood.
5LO—D. A. Millar, 195 Robin Rd., Semapho
5PQ—P. Muscat, South St., Magill.
5QP—K. M. Theel, 8 Caulfield Ave., Clare Park.
5RN—D. S. Robertson, Maroonika, Mt. Lofty
VK6LL—C. E. Bishop, 14 Weld St., Claremont.
VK9WL—J. Widdup, c/o. O.T.C., Kavieng, N Ireland, N.G.

Alterations:—

VK2ACG—A. Morris Rees, Kingston Guest Hou Kingston, A.C.T.
2ADC—G. S. McLeod, "Modwina," Stoney Cre Rd., Beverley Hills.
2ADH—F. C. Deaman, "Franklin," Fullers Guildford.
2AGZ—R. C. Yates, 28 Prince Albert St., M man.
2AKB—K. B. Brown, 73 Western Cres., Gla ville.
2ALR—B. Hannaford, Flat Rd., Bolwana, W Maitland.
2ASF—S. C. Fletcher, Royal Hotel, Kempsey.
2AM—L. D. Cuffe, 30 Bradley's Head R Mosman.
2EA—L. Martin, 36 Breimbar St., Grafton.
2FM—F. A. Murray, c/o. M. T. Pickard, 2 W lace Pde., Lindfield.
2FR—J. F. Howarth, "Milton," Sydney R Holbrook.
2QM—S. C. Broadbent, 32 Bellevue St., Man
2RN—T. H. Russell, Radio 2BS, Bathurst.
2TH—T. R. Heimann, 58 Duntroon St., Hur stone Park.
2UN—R. J. Scott, 49 Brae St., Inverell.
2VU—G. D. Partridge, 23 Hunter St., Singlet
2WQ—R. T. Wilkins, Thomas St., South Graft
2WW—J. M. Woodward, "Aston," 13 Jose St., Blakehurst.
2YA—R. C. Black, 23 George St., Liverpool.
2ZO—W. W. Jenvey, 9 Forsyth St., Willough
VK3ALF—A. T. G. Hansen, 4 Henry St., Hawtho
3ARB—R. A. Bourchier, 61 Primrose St., Ess don.

3ARL—O. L. Brown, 32 Ward St., Ashburton.
3ARV—R. G. Henderson, 261 Bouverie St., Carlton.
3BG—R. B. Jones, "Lesebray," 25 Panoramic Rd., North Balwyn.
3BH—C. R. Whitelaw, Box 92, P.O., Dandenong.
3HI—L. G. Reynolds, 21 Nirvana Ave., East Malvern.
2HU—C. G. Burke, 97 Riversdale Rd., Camberwell.
3SD—C. D. Wordsworth, Calulu, via Hillside.
3ZH—C. H. Hyatt, 30 View St., Alphington.
3ZF—G. G. Coventry, Warwick Rd., Greensborough.
VK4HF—H. A. Fitzalan, Highland St., Wavell Heights, Brisbane.
4SD—A. H. Sharland, Boondall, Brisbane.
4XE—F. H. Doherty, 3 Oxford St., Hyde Park, Townsville.
VK5AZ—H. R. McGrath, c/o. Dept. Civil Aviation, Daly Waters, N.T.
5BW—A. W. H. Wright, c/o. A. E. Wilson, Miltalie, via Cowell.
5EZ—L. E. Hauber, 220 Goodwood Rd., Colonel Light Gardens.
5MA—A. J. Martins, c/o. Electricity Trust of S.A., Berri.
5MZ—A. M. Tonkin, 23 Third St., Salisbury.
5RF—P. R. Parasceis, 138 Anzac Highway, Glandore.
5XX—R. de E. Minchin, 14 McGilp Ave., East Glenelg.
VK6RB—E. F. Robins, 4 Egina St., Mt. Hawthorn.
6SR—Radio Society of W.A. Inc., 8 View St., Subiaco.
VK7GC—C. D. P. Clarke, c/o. Station 7HO, Hobart.
7MY—A. H. Morrisby, 48 Central Ave., Moonah.
VK9BP—B. P. O'Connor, Dept. Civil Aviation, Rabaul, N.G.
9NR—N. G. Roberts, c/o. Dept. Civil Aviation Norfolk Island.

Cancellations:—

VK2ABE—A. E. Misdale, Barrenjoey Rd., Newport Beach.
2AJO—R. A. Joscelyne, 71 Cheltenham Rd., Cheltenham.
VK3ACB—G. F. Curboon, 26 Jersey St., Balwyn.
3OW—S. L. Hammock, 67 Delaware St., Reservoir.
VK4PB—J. P. Broome, 111 Days Rd., Grange, Brisbane.
4SA—A. S. Smith, 35 Whynot St., West End, Brisbane.
VK7AH—F. W. Medhurst (deceased), 9 Beach Rd., Lower Sandy Bay, Hobart.
VK9JO—T. S. Hefner, Aust. Petroleum Co., Port Moresby, Papua.

FEDERAL QSL BUREAU

RAY JONES (VK3RJ), MANAGER

The QSL address for Morocco is Service QSL A.A.E.M., Postbox 50, Casablanca, Morocco.

Alfredo Quintana, QSL Manager for Chile, advises that for better service all cards should be addressed to P.O. Box 761, Santiago, Chile. Alfredo also desires to exchange stamps with any Australian philatelist.

Recently a paragraph in these notes gave a new address for the Italian QSL Bureau. The General Secretary of the A.R.I. has now written stating that the new address given is not authentic and emanated from an unauthorised Radio Club. The QSL address for Italy therefore remains as A.R.I., via San Paolo 10, Milan, Italy.

W1JL ex-CN8EG Joe Kazokas, 34-15 94th St., APT, B28, Jackson Heights, N.Y., U.S.A., solicits all cards regarding contacts with CN8EG be sent to the above QTH. Joe was at the U.S. Naval Air Station, Port Lyantey, but is now back at the C.R.A. Station WSY situate on La Guardia Field, New York.

Mail addressed to KA1FT, care Institute of Technology, Manila, P1, which was the QTH given by KA1FT, has been returned unclaimed and unknown.

The Radio Club of Chile has instituted a Certificate to be awarded to any foreign Amateur who has worked at least one station in each of the seven radio districts of Chile. CW or phone contacts made after 19th November, 1945, will be accepted. The seven cards should be sent to Radio Club Chile, Box 761, Santiago. After checking they will be returned with the Certificate.

Notice has been received of the re-organised National Amateur Society in Hungary, styled the M.R.R.E., which in English means Hungarian Short-wave Amateur League, with the address as Box 185, Budapest 4, Hungary. The QSL Bureau is situate at the same address.

Notes suitable for inclusion in this column are solicited and should be sent to the Federal QSL Manager.

From Reg Jepson (VK3JI) comes the information that Frank Soltis, ex-HL1BA and J2AAY, is now

FROM A MATCH BOX RADIO
TO A LARGE CONTROL PANEL
THERE ARE
IRC RESISTORS
for every electrical need
IRC METALLIZED RESISTORS include Types BT, F, MP and MV. They are small, compact Resistors with lower operating temperatures and higher wattage dissipations than was formerly obtainable with respect to size.
IRC Type BT. Because of low resistance contact, obtained by high-pressure moulding, the noise level is uniform and consistently low. They are crack-, break- and vibration-proof, and are completely sealed against moisture.
IRC Type F. The Metallized filament is enclosed in isolantite body. The completely-enclosed contacts and non-hygroscopic body protect the units against abnormal atmospheric conditions. They carry overloads up to 100%.
IRC WIRE-WOUND RESISTORS. Range from 3 to 200 watts, and built to withstand heavy overloads. Proofed against moisture, they even withstand salt water immersion.
IRC VOLUME CONTROLS. QUIET in operation. The 5-finger, knee-action contacts ride over the element as smoothly as glass. They will not powder or alter in resistance appreciably throughout their long life.
Resistors for SPECIAL applications made to specification
SOLE AGENTS FOR AUSTRALIA
WM. J. McELLAN & Co.
BRADBURY HOUSE, 55 YORK ST., SYDNEY
BX2508

back in U.S.A. with QTH as W2QMD, 14 Van Cleve Ave., Clifton, N.J., U.S.A. Frank had the misfortune prior to leaving Japan to have all his DX cards stolen by one of the local thieves. These cards are valued by Frank as pleasant momentoes of contacts made from HL1BA and J2AAY, and Frank requests that any VK who worked him at either of the above calls please send a duplicate card either direct or via A.R.R.L.

VK2NF has received through the mail from Colombia, South America, a QSL from HK3IR, Dr. William Elasmar, for a contact on 4 Mc. As he has never used 4 Mc. and has never worked a HK guess that HK3IR either misheard the call or was the victim of a pirate who kindly supplied him with his call and address. If the caller was genuine he can collect his card from VK2NF. Any pirate who should apply will receive a suitable welcome.

NEW SOUTH WALES

Mr. N. H. Hicks 2ANA gave members a very instructive lecture on "Industrial Electronic Control" at Science House under the chairmanship of the President. Two fine films, which were an eye opener to most of us, were used by Mr. Hicks to illustrate his lecture. These gave convincing proof of the wide range and ramifications of electronics in industry and showed what a lusty youth has grown up from the little baby that the early radio experimenters fostered a few years ago. Such lectures as these broaden the outlook of members and are very welcome.

EASTERN ZONE

Activities in the Eastern Suburbs limited this month. A few stations heard on CW in the Contest. Guess the boys are waiting for phone section. 2CE active on 40 phone after an absence of two years on that band. Alf is keeping his fingers crossed and hoping for the best re B.C.I. 2DV rebuilding his mod. and P.A., after a spell off the air, due to study and exams. Alex also has a new receiver. 2ALW active on 40 and 20 phone, using QRP rig with indoor antenna, Laurie manages to work a little DX. 2AFZ heard on rare occasions on 20 phone. Eric is content to just listen. 2NO in addition to his VHF gear has three separate rigs, on the popular communications bands, each using 813 in final. 2CF rebuilt during the winter, now putting out a nice sig. 2FG lives within 20 yards of the surf, when the winds are high John loses his beam and the rig gets salted up, however he is still able to work plenty of DX. 2AHQ changed his QTH and has rebuilt the rig making it smaller. Would like to know what has happened to quite a lot of the chaps in this zone, such as 2TN, 2JO, 2AHJ. Quite a number of fellows seem to have given it away. I would be pleased to hear from any of the chaps in this zone regarding their doings, keep a look out for 2AX on 7 Mc.

WESTERN SUBURBS ACTIVITIES

While the writer has been busy at his work and unable to fully report on local doings, a number of good friends have come to the rescue. Any contributions of news would be greatly appreciated and may be passed over the land-line to BO399, Ext. 327 any week night after 8 p.m.

You can't beat the old-timers! Alec Robinson 2GR is back in circulation once again after several months in Yaralla Military Hospital. No late nights for Alec but he still works his share of Gs on 20. 2WB was heard going to town on the South Americans. Speaking of South Americans, 2JP has a keen interest in the lady Hams and is always on the lookout for Sara in Antafagusta, Chile, not mention Gert, the Canadian girl with the come-hither laugh. You young devil Jack! That Collins job must be sparking well. 2AGU, the DX king of Abbotsford, has not been heard lately. Harry must be cooking up something special!

The Burwood Experimental Radio Club, moves into new premises at Greenwood Hall, Liverpool Rd., Enfield, and will have 6 metre and other gear available. In addition there is a well equipped workshop. A big supper is planned for the opening night, Thursday, 14th October. Gladesville Radio Club will conduct a Field Day second week in November. The hunt will be on 40 for a hidden transmitter. The change is from VHF to prove that they haven't got lost up in the Sporadic E.

2AER comes on 40 phone to chew the rag and can he chew it! Just as well rationing is a thing of the past, else Max wouldn't be able to buy new hankies. No offence Max! 2AGW testing mikes with a G3 received the following reply in rich Stanley 'Olloway accents: "Better stick to old one bud! Sounds like talking into two pint joog!" All ended well. 2OQ still works the DX on 20. 2DW not heard often. 2NM still on 144 with a 40 ft. high dipole, gets out well. Harry also goes mobile with a 522. 2TD works some DX on 7 Mc. OW when he can tear himself away from that old cement mixer. No, not the rig, its business. Don't forget to pass the word! Thanks chaps.

SYDNEY SOUTH ZONE

It takes a super sleuth to find out what the chaps in this area are doing. Most seem to be inactive at present but a few of the regulars can be heard nightly. The VHF Contest opened with a bang and 2ABC, 2WJ, and 2VW are active on 50 Mc. and 144 Mc. piling up the points. John, 2WJ, is leading at the moment, but there is a long way to go yet. 2ABB is heard on 20 and 40, and 2AB is busy rebuilding the rig. 2AC is on all bands, but Leo is badly handicapped by lack of space for an antenna. Now chaps if you want these notes to continue what about letting me know what you are doing so that I can include some really interesting news next month.

NORTH SHORE ZONE

Spring, and the usual upsurge of activity is with us again. The spate of rebuilding that has been going on during the winter is showing results in many a shack, and well-known signals that have been missing for a few months are back on the air. All in all, it looks like a good season ahead, U.N.O. permitting. 2HL is mad with the activity on 144 and 288 Mc. two bands which are claiming many of the old-timers these days. Another is ? 2AGO is the proud possessor of a pansy 3-element 20 beam, which is paying hadsome dividends. 2HG doesn't get much time at the game nowadays, but chases the odd bit of DX on 20 with a 40 watt rig. 2SV another with a 3-element beam which points madly in all directions at once, according to reports. 2ARR stirring up a mild cyclone—what's happened to the garbage man, Graham? The Manly stalwart, 2DA, still going strong. Has a new AMR100 receiver now and was very active in the Contest, with the receiver doing an FB job. 2BA is in the throes of bunging together a new receiver with double conversation and hot and cold water laid on. A new one down that way is 2AMG, heard on quite frequently. 2JX had very bad luck in the Contest. One of the tubes in his new push-pull final gave up the ghost right at the start of the Contest, and in the flurry of changing over to a single-ended job with the other tube his neutralising condenser flashed over and scuppered the remaining one. A dim view with the consistency of a pea-soup fog has settled down on Avalon. Fooey to Contests!! 2ES and his rotary dipole are still doing good business at the old stand. He provides good DX for 2BQ occasionally. 2BQ incidentally is undecided whether to erect a beam, or chop down his existing mast and string a couple of wires in the attic. Shore is a mess, ain't it, matey! 2AGZ, long one of the Wollongong boys, is now settled in Mosman, and punching out a nice signal on 20 phone. 2AM and 2PV still rebuilding. Have not heard 2ADV for a while. When is that beam going up, Mac? 2JG is in process of rebuilding the rig into a beaut rack and panel layout. 2ZZ heard working 11MT, his new folded dipole lending quite a hand. 2AQQ is practically the mainstay of 40 phone these days—am thinking of signing him up as a marker for the band!

ST. GEORGE

2FQ not very active, uses 6V6-59-807, zepp antenna and 8 tube super, mainly on CW on 40. 2GM works all bands and is using 802 ECO, 6L6 buffers, pair 807s in final, 6L6s in AB1, home-made 10 tube super and zepp antenna. 2AVT will be on air shortly using 6V6-807-807 running 50 watts AR8 receiver and antenna is zepp. While rebuilding 2AGA is using a Type 3 Mk. 2 on 80 and 40, zepp is the antenna and a home-built super. 2US is mainly heard working 20 phone and gets out well. 2RF active on 40 CW and phone, also on VHFs. 2AML working on 20 phone, 6A6-807-809, with 50 watts input, zepp antenna and 15 tube super. 2ALZ hopes to be active shortly getting some gear together, inactive since 1939. 2IY is using command transmitter on 20 CW, receiver is B38 and uses vertical antenna. 2RE trying out 3 stage pre-amp., 20 phone. 2YH heard regularly on 40 phone, trying to track down hum. 2JJ using 3 stage VFO, 4 stage band-switching exciter using 4 807s for 80, 40, 20, 11, 10 with 813 in final, 811s as modulators, No. 4 receiver and zepp antenna. A 6A6-807-809 is 2ASK's line-up, 809s in class AB serve as modulators, receiver is a Halicrafter Skyrider, antenna is S.W.M.I. co-ax fed with 72 ohm and works well.

DX ACTIVITY

Thanks to 2YL and 2TG for their interesting letters on their DX activities. Remember chaps, the more information you send in, the more interesting these notes will be. From 2TB we have the following suggestions. I would like you to let met me have your comments and any further suggestions on them:—

1. How about forming an "S9" W.A.C. Club (either phone or CW)? Its members could contribute for a special set of cards as has been done by the Pearl Harbour, Corpus Christi, KZ5, KP4 and Frankford Clubs.
2. A 50/50 Club, 50 CW, 50 Phone. The road to DX C.C. phone is tedious for VKs. I know how hard it is as I have 141 countries, 38 zones and 84 on phone. The latter appears to be my maximum as I can't speak various languages to copy some of the harder Europeans.
3. How about a Junior DX Club for those who hit 50 countries? Many Hams take Ham Radio

GLO-RAD

ANNOUNCES with pride the latest addition to the ever-growing "GLORAD" family.

CO AXIAL DIPOLES SERIES 2090

AVAILABLE NOW for both 144 Mc and 288 Mc.

IMPEDANCE. 75ohms. FINISH. SILVERPLATED

Write or Call

GLORAD ENGINEERING SERVICES

186a Riversdale Road, (Cr. Robinson Road)

HAWTHORN ——— VICTORIA.

Phones DAY: WA 3819 NIGHT: WX 3440

as a hobby and are not slavishly chained to the DX urge. 50 countries is a fair effort for recognition.

Well, there's something for you chaps to think over and don't forget to let me have your ideas.

2TG reports 28 Mc. as being good at Orange. G, F, OH, GW, GI, EI, UAs for Europe and Asia. South America being represented by HC1FG, HC1JW, HC1KV, HC2AS, OA4AN, VP4TO, VP3TR, HK3CU, and YV5AC. Central America TI2OA, TI2AFC, HR1MB, VP9F, and CO2LW. Africa VQ2DH, VQ8AE, VQ4HRP, VQ5RHP, ZD4AH, ZE1JI and ZE1JH.

ZD4AH was VK2ALO and would like any spare copies of "Amateur Radio" if any of the boys have any. QTH: Sekondi, Gold Coast, West Africa.

VK2YL sends in the following: 158 countries and 40 zones worked post-war (which is a grand effort); 14 Mc. CW 138, 14 Mc. Phone 41, 28 Mc. CW 68 and Phone 82. 2DI brings his grand total to 172, having grabbed C3EA (Formosa) and MP4BAB (Oman) who is ex-VS9GT. 2QL also landed C3EA on CW after a lot of trouble with power leaks, etc.

2YN and 2RA have been on very little but can be heard there when the good DX is coming through. See the honour for their scores. No news of 2HZ this month, he is evidently having a spell. I would like to hear from the following VK2s on their DX activities. 2GW, 2TF, 2AHA, 2ZC, 2DG, etc. Your DX notes for the month of October will be compiled by 2DI as I am off for three weeks on the north coast of Sunny New South, fishing, etc.

A few scores are to hand for the Honour Roll, so here they are: Phone/CW—2DI 40 zones 172 countries, 2ACX 40-164, 2YL 40-158, 2EO 40-145*, 2HZ 40-140, 2QL 40-138*, 2TG 38-141, 2RA 38-128, 2VN 37-127, 2BA 37-109. Phone only—2DI 30-95, 2TG 84 countries.

Here are a few QTHs for those who need them:—
PZ1FM: P.O. Box 118, Paramaribo, Dutch Guiana.
CT3AB: J. A. Ferraz, Rua de Santa Maria 261, Funcaal, Madeira Island.
IS1EH: G. Marras, Vilae Regina Elena 21, Cagliari, Sardinia.
PJ0X: via W8NBK.

NORTH COAST AND TABLELANDS

2ZY active on 40 only, is on the job constructing a band-switched 12 tube super around the multi-band coil unit recently announced. 2RK away on holidays. 2FN back to school again after the vacation; rather "browned off" due to a move to a village with no AC! 2ARJ experimenting with 50 Mc. gear and has had excellent cross-band contacts. No luck with 2PA who is 80 miles away, 90 per cent of the distance is over the sea so a contact should be made soon. 2JK building for 6, hearing 2ARJ at S9 and the antennae on the mend after the gale. 2AEY been enjoying visits from 2AGU who is working on the new commercial at Taree. Harry will be in the district for some weeks yet. 2ZY mainly on 40 CW but has been grid modulating the 6V6. 2ASF with 6V6 CO, 807 cathode modulated with P.P. 6V6s, housing still a problem. Both 2ZS and 2ASF spent a recent Sunday visiting 2PA, 2SH and 2DS; 2ZS receiving some acclaim as a pianist. 2AFP back on 40 but line hash restricts his contacts except with S9 signals. 2XO minimised his line noise by keeping the antenna away from the H.V. line and using a twisted pair —result he now hears signals he has not heard for years.

NEWCASTLE

Best news of the month is the arrival on of Frank Cross VK2FX, what a signal! Very excellent phone using speech clipping and he will soon have a beam on 10, the envy of all. 2AGD, 2AHA and 2ZC been lying low but watch the splash when the Contest starts, I am sure the city of coal will be represented when the final figures go up. 2DG was bowling them over at one a minute in the CW section of the test, he can surely pound the brass. 2PQ has at last his 10 metre beam going and working DX everywhere, knows now how the others used to do it—it is up 42 ft. on the side of a hill. back, would like to see a paper describing methods enough said. 2AFS spent many hours chasing feed 2TE heard on 10 and 20 and gets what he calls, of overcoming same. 2CW says he will be on soon on 10, has been on 20 with two elements when not busy doing secretarial work for the local Radio Club. 2ANG what is the matter with 10, would like to hear you. Congrats to 2ANA and 2ADS on receiving their tickets, we will be listening for you chaps. 2FP only wants three countries for his century on 10 phone.

COALFIELDS AND LAKES

2ADX active on 28 Mc. as well as 144 Mc., using new beam on 10 and only Maitland station heard. From Kurri 2KZ and 2KF keep the place on the map. 2KZ very close to realising his ambition of W.A.S. on 10 metres. 2KF liable to be heard anywhere but usually on 10. Old-timer 2JZ going to town on 10 phone, good signal and beam bringing results. 2TY doing nicely on 10 phone, worked 19 new countries in three weeks. 2ADT settling down to some DX after the rebuild, on 6, 10, 11, 20 and 40, cards away for DX C.C. and 95 countries on 10 phone. 2MK on 10 occasionally the rig has a wog in it. 2PZ not heard, QRL work. 2OC and 2RU active on 6 metres from Wyong and Gosford. 2YL working 20 and 10, but finds the conditions patchy.

SOUTH COAST AND TABLELANDS

We welcome 2VS back to the zone. Under way using 6V6-807 and cathode modulation, No. 11 receiver and a good signal with antenna 15 ft. high. 3JK and 2PI and the latter's XYL passed through Yass, both chatted with Z.O. 2DO en route. 2PI is set up in his new home and the rig going with 90 watts to P.P. 807s, plate modulated. Some 144 Mc. work between 2PI and 2VS to be attempted in the near future. 2AMW also has 90 watts to 807s, nice T9 signal. 2WP improving every time heard, the big sticks are close to being erected and 20 will get some attention. Reported from the Wollongong Club that a new Ham will shortly join the ranks.

2RM at Duntroon very active, and a lot of the gang are becoming acquainted with the gear used at the military college. 2AIK helps with news and 2PI on the social side. 2OW shared in a contact with KJ6AB on 40 phone, 2OW using 5.5 watts input, so that was nice going. 2ALS gone QRP, sold all his QRO equipment, also disposed of AR7 so it looks as though the AR8 plus 6V6-6V6 will remain the source of entertainment for him. 2AKE Rye Park bogged with work and no time to relax with Ham Radio, 2DO threatens to visit him one day. 2JQ made additions to the receiver, 6V6 output and new dial improved things a lot, allows the operator to wander about the house whilst listening. 2DO managed a contact per country in DX test, got up to ten in end.

SOUTHERN

Our "old reliable" for the past 15 or 16 years has moved away, Roy 2TH is now radiating from Hurlestone Park. 2GE who went to Moree has been contacted on 40. 2AID has been active on the warmer nights on 40, has a 522 on 6. 2ANT plugs away on 40 CW while fellow worker 2AKY has as yet not used his call. The latter may have to go to Holbrook and will use 40 and 6 to stop himself from going mad. Pre-war Wagga identity 2YW has never been heard since the war, very QRL we believe. The underground has it that two P.M.G. chaps will soon have calls, while "Bill" is at last sitting for his ticket. 2PN made the long trip from Tumut just to see if 2BW was on frequency in the 6 metre band—he was! Cross country checks with 2TA and 2TC of Young with 2PN have shown the need for a beam for out of town work. 2TA was heard for a short while in Wagga at S7 later at S3 to 4 by 2BW using a straight dipole. 2BW would like skeds with any Hams in the Riverina on 6 metres either transmitting or receiving, checks could be made on either 40 or 80. 2IX is doing some good work on 40 and 80. 2BW writes the above notes and he soon hopes to have a VFO on 6 so he can get towards 50 Mc. where all the beams are peaked. 2OJ's tower withstood a 50 m.p.h. gale so he is quite happy with it.

WESTERN

2FH getting good results from the four elements wide-spaced on 20. 2EF Warrimoo been working on 10, but still busy. We thought we had a new Ham in the zone at Penrith "VK2ALI," he made a big noise on 40 phone, not only not in the zone but not licenced!! 2HZ at last heard something on the VHFs when on 144 Mc., maybe the receiver is now working properly? 2LZ busy in the VHF Contest, very popular with the Sydney stations as he is extra points for them. 2LY has 813 modulated with P.P. 830Bs, he is building gear for 2ACP who is now in VK4. 2NS and 2WH both had slight interests in the DX Contest. Z.O. 2QA QRL rifle shooting, believe they pop corks as well as rifles at shoots, maybe that is taking him away from Ham Radio.

VICTORIA

An old-timer in Charlie Whitelaw VK3BH has been appointed and sworn in as a Justice of the Peace for the Central Bailiwick. His beam and tower has not yet been erected on account of delay of supplies, illness of his wife and self, but has hopes for some results early in November.

EASTERN ZONE

The fourth Eastern Zone Convention will be held at Leongatha on 27th and 28th November and a cordial invitation is extended to all Hams to attend. Those contemplating making the trip are requested to notify 3QZ or 3DI so that arrangements for accommodation can be made. The programme will be: meet in Leongatha on Saturday afternoon, dinner at 6.30 p.m., meeting at 7.30 p.m., Sunday morning inspect local Ham shacks, and it is requested that as many as possible bring portable 50 Mc. gear with them as the rest of the day will be spent hunting for a hidden 50 Mc. transmitter.

For further information it is suggested that members and visitors listen, or better still, join in the Zone Hook-up each Sunday night at 2000 hours on 3650 Kc. A cordial invitation is extended to all Hams wherever they be to attend the Convention; we can assure all, a very enjoyable week-end.

Th stork has again visited this zone and deposited a junior op (a son) at the home of 3AHK. No time for DX now Ossie! 3AEP has a 50 Mc. receiver working while 3TH has purchased a converter for that band. It is to be hoped that they get transmitters going on the 6 metre band soon like 3LV who is revamping a SCR522. 3CI is doing very well with his SCR522 on both 50 Mc. and 144 Mc. and has had some very encouraging reports of his signals on the latter band during the last field day.

3DI and 3VL keep nightly skeds on 6 and rag chew for hours, they talk on anything from apples to radio! 3AKM is reported to be building a new tower for his beam. Nothing has been heard of 3BB or 3ALS lately but believe they are active on 7 Mc. Does anyone know what 3ANC is doing; he hasn't been heard for ages. 3WE still keeps Omeo on the map, your 80 metre sigs are very good now Bill. 3SS still puts out a solid sig on 80 and is still talking of getting going on 50 Mc.

3QZ, our busy secretary, does not get much time on the air, is busy building a new home. 3AFL is a new Ham at Bairnsdale, he was originally 6FL. Welcome to the zone OM and hope to hear you on the air soon. 3ALT is another newcomer to the zone and is on a farm near Sale. 3PR is QRL with farm work and does not get much time on the air. Has a new Type 3 Mk. 2 and getting out well on all bands.

The monthly meeting of the Eastern Zone Sub-Branch was held on the 11th October when there were 21 present. Applications for membership were received from two associate and one full prospective members. Apologies were received from 3GE and 3BQ who were to have given a lecture on crystals. Business arising from a meeting at the W.I.A. Rooms was the question of banking and election of a Vice-President, which was deferred until next meeting which will be held at the Balcombe Camp on the 8th November. There was an interesting and informative lecture on VHF and UHF tubes, and tuning systems, and a demonstration of the various effects of modulation as seen on a cathode ray oscilloscope (double beam) given by Sgt. Roberts.

NORTH EASTERN ZONE

Zone hook-ups are now entirely on the 80 metre band. First Sunday 9 a.m. and third Sunday 9 p.m., net to 3690 Kc. The majority favored this arrangement, the only ones against being those too lazy to erect a balanced antenna to eliminate BCI. However, by recent developments it seems as though nobody wants the zone, and probably it will just drift apart.

3UI had a week visiting 3DI, 3CI, 3RR, 3HK, 3ABA, 3YS, 3PG and 3HT. Six metres was main interest for Alan, and he came home with many fresh ideas. Now planning a super set-up. 3DW has been on holidays also. Not much dope on them, as I only heard the last couple of hours of his contact with 3KR. Doug's antenna came down in the breeze when the strings gave way. It is now up again with string repaired. 3KR is in good form again after the flu. Ken is keeping fist in on 20 metres. 3TS had his 6 metre signals heard near Foster R5 S5 on phone; Tom is rebuilding for 80 and 40 metres.

3APF now has W.A.C. on ten phone. Sick of DX in general and Ws in particular; is building for 144 Mc. Peter is the only Ham game to enter your scribe's shack for months. Even he kept his hands in his pockets. 3ACW is active on 40. Chas. has been running VHF tests with 3ABG. 3UI, 3APF and 3ABG went to Mt. Major for the 144 Mc. field day, but due to abnormal weather, conditions were the worst yet. No results on 144 Mc., and patchy on 50 Mc. Seven complete stations, 9 batteries, a pertol-driven charger, and a stack of genemotors and vibrators were used. On 50 Mc. main rig was 3UI's home station gear, 30 watts input and about 13 tube receiver with 3 element beam. On 144 Mc. we had an SCR522 and an extra receiver with a ten element beam. We intend trying again, next time with 3ABG's home station gear with 100 watts, from a Mountain near Avenel. Would anybody like to come along, the view is excellent, and there wont be more than 5 tons of gear to load on the truck.

CENTRAL WESTERN ZONE CONVENTION AT HORSHAM

Central Western Zone Convention, although timed for 2 p.m. on Sunday, 12th September, really started with the arrival of 5PB and 3TY on Saturday afternoon. A long and lengthy session immediately started up in 3TA's shack. Another early burst was the meeting on the Stawell-Horsham road of the Ararat-Stawell gang with three strange and questionable characters complete with top hats, false beards, and dirty big grins who turned out to be the Maryborough gang in their true colors, led by that shameless scamp VK3XC.

Thirty Hams, Associates, etc., met at the assembly point including 3TY, 5PB, 3LF, 3ARM, 3DP, 3AKP, 3XC, 3IQ, 3AGR, 3XU, 3AWN, 3AKA, 3TA, 3FI, 3GN, 3ATR, 3EF, 3AKW, 3CH, 3ACE, VL3KR, VK3KR/3, VH5AH, 3YW and 3QL. Apologies were received from 3HL, 3TL, 3BM, 3CE and Associate John O'Halloran.

First item was the 50 Mc. field day, and we must confess keeping to the zone's usual form, the base station, although on view, was inoperative owing to Claude collecting a piece of steel in his eye. The rig was a beautiful job finishing up with an 829, and reminded us somewhat of the layout of a 522 without being so cramped; however we high-tailed it out to the country and set up the portable rig in the fond hopes of picking up 3ABG or 3CI (who had kindly, but rashly, gone to their respective mountain tops). When the big switch was thrown, wires ran hot, the generator groaned and DC (very hot) appeared on the chassis and panel, systematic and unsystematic checks failed to locate the trouble and the boys were reluctantly forced to give up. However the VL boys were thoroughly enjoying themselves all this time by keeping up their regular skeds with surrounding districts.

About 4.45 the gang pulled up to 3WV to admire and marvel at the 10 kw. rig and 680 foot stick, and our thanks are due to the staff for their courtesy, and patience, in showing us around. After this it was time to eat once more; just what some Hams can eat is a never ending source of amazement, the Maryborough gang must have starved for a week, but at last they were almost satisfied and we were able to get started on the business end of the business.

First item was a Dutch Auction in aid of the W.I.A. "Food for Britain," £16/5/- being collected from gear which had been donated by various members of the zone and ranged from 50 watt bottles to tiny zero-coefficient condensers, while it lasted the fun was fast and furious.

The annual meeting was then commenced; 3GN was re-elected President, 3ATR and 3AKW Vice-Presidents, 3YW Treasurer and Secretary; 3ARM, 3FI and 3XU Committee. Lack of attendance at zone hook-ups was discussed and it was decided to hold the hook-up at 2 p.m. on the usual second Sunday in the month on 7120 Kc. (so you sleep-in blokes will have no excuse now). Among other matters discussed was an appreciation of the good work for Amateur Radio in general done by "Gremlin" in the magazine, to encourage better operating procedure, and better signals.

3TA offered to donate six 807s to be awarded at the end of the year, to the zone stations who had the best operating procedure, best signal, or who had the most outstanding record for the year. The offer was accepted and the committee will be the judges, so chaps the ball is at your feet, brush up on the regulations, no funny phonetics (you will find the official ones in the Handbook) and watch your step, clean out the keyclicks and let's show the other zones what we can do.

3TY moved a vote of thanks to 3TA for his work in making arrangements at the Horsham end; he certainly deserved it because nothing can ruin a convention quicker than bad staff work. Our thanks are also due to Mrs. Hardinge for entertaining Mrs. 5PB during her stay in Horsham.

The next convention is to be held at Warracknabeal sometime towards the end of March, and members can look forward to another good show.

Among the interesting items seen at Horsham were 3TA's elements for his new 20 metre beam, they get over the worry of long supports or the possibility of getting light weight tubing such as dural; Byron had them made at the local plumber's out of ordinary galvanised iron sheet, and they consist of tapered pipes, tapering from 2½ inch diameter at one end to ½ inch at the other. They are very light, strong and can be supported quite easily by a 12 or 3 ft. support. Another eye opener was 3EF's antenna, Bert is working loads of CW DX using an inverted L (shades of the past).

Associates present became so impressed with the outstanding individuals present that four were signed up and will forward their forms with the necessary cost. VH5AH could have been roped in also but was referred to VIA.

These country conventions are certainly a great social success, voices materialise into all sorts of surprising shapes and we return home with a better appreciation of each other's personalities and problems. Please gang don't forget the problem of the **Zone Hook-up at 2 p.m. on the second Sunday in the month on 7120 Kc.**

QUEENSLAND.

In spite of heavy rain, a large attendance of members was present at the September general meeting. The President (4AW) occupied the chair. Discussion on the conduct of general meetings was opened by 4KB, who expressed the opinion that Council should deal with all business and that general meetings be devoted to a report from Council, and a lecture. The motion was supported by 4FN, and was carried.

At future general meetings, members will wear identification tabs. So fellows, no more wondering who is sitting next to you; just read his disc and strike up the conversation.

On 6th October, the Brisbane gang visited the Frequency Measuring and Monitoring Station at Capalaba. Rumour has it that a certain VK4 now has a twenty-four hour clock in his shack.

Those able to attend the general meetings these days are having a feast of good lectures. At the last general meeting Mr. Strohfeld delivered a very interesting lecture on the subject of "Microphones."

A suitable room for Queensland Headquarters has been found at last and it is hoped that before long to install our Library and VK4WI in a central QTH. Service in the past has left nothing to be desired and it is hoped the contemplated change will not materially alter the present service.

Results of the 1948 B.E.R.U. received from G8HH show that in the senior section, 4RT was 25th with 1,609 points and 4RF 46th with 1,045 points. In the junior section, VK4 did a little better. VK4EL running 2nd with 1,609 points, 4TY 6th with 1,069 points, and 4XJ 13th with 593 points.

BAND ACTIVITY

3.5 Mc.—4SV using command set, made the Contest boys in ZL happy. 4AF working ZL on CW, and 4KK doing a little on the band when not working on the 50 Mc. gear.

7 Mc.—Nice boost for Toowoomba Les (4ZZ) the other night when I heard you singing the praises of the "Queen city of the Downs" to 2SH. 4MR active again on CW. 4SV and 4NO on a recent visit to Sydney, met a number of VK2 Hams, and also had FB chat with VK6JS, who was also in the "Harbour City." During the past few weeks the good old 50 ft. a side has been the subject of long debates among VK4s on this band. 4GG and 4CU coming in for much chaffing. 4XP still very active on CW. Jeff has an Eddystone 640 and runs his rig off batteries. Jeff is CW only and manages to work some DX when not working in the sawmill at Numinbah.

14 Mc.—It is not often that we hear any VK4s south of Rockhampton operating on 20, but during the past month a number of stations in the southern area have been heard, among these being 4FN, 4PR, 4XR, 4PD, 4LD, 4RT, 4VP and 4MW. Last couple of weeks in September were very good for DX and VK4s were heard working a number of the not-so-well-known prefixes. 4FH was heard being serenaded by Sara. Nice work John! 4KW uses an 813 and 60 watts into a half wave windom. Terrific signal at most times Harry!

28 Mc.—At last this band shows signs of opening up, signals now coming in at good strength at night. During the day the band is fast becoming a DX hunting ground. 4PG, 4HE, 4JP and 4XJ are reported to be doing very well. Countries heard fairly consistently are W, ZL, J, KG, PA, GI, HC and by far the best of all, G phone stations.

ZONE NEWS

Central Zone (VK4HZ).—We are pleased to report that in the Otago Centennial Contest (N.Z. A.R.T.) 4XJ gained first place in VK with 4HZ running second. Nice work Les and Jim! VK2ARH met the Bundaberg gang at one of the Club's weekly meetings. A newcomer to this zone is 4CR.

Townsville Zone (VK4GD).—Townsville Radio Club celebrated its first anniversary on 1st October. Office-bearers for the coming year were elected: President, Mr. R. Greenwood; Vice-President, 4GF; Secretary-Treasurer, 4GE. The Club has a membership of 22 enthusiasts made up of licenced Amateurs and future Hams.

Mackay Zone (VK4KW).—During the past month a new zone has been formed with Harry Dearness 4KW as the leading light. Members in this zone are 4KW, 4FH, 4EW, 4OW, 4KR, 4MA, 4MU, 4AM, 4ZP and 4BQ. The latter is an ex-VK9. We have it on good authority that the Mackay gang are seeking passports to Chile. A certain XYL in Antofagasta has been serenading John, and the boys are getting jealous. The other night a VK2 tried to gate-crash the party and Sara replied in song with "Hold your hand out naughty boy." Not a bad idea for those VFO men who use netting to bust up a DX contact.

South-West (4ER).—4UX paid a visit to Laidley during last week-end in September. Claude and 4LD showed the W.I.A. network what can be done with a piece of string soaked in brine as an antenna. 4LD is a butcher so no doubt the next antenna to be used will be a string of sausages. During first week-end in October 4TY and 4SN paid a visit to the Clifton boys. A very FB time was had with 4CU and 4AF. 4KK, although not present in the flesh, added his bit over the 50 Mc. channel. Much activity around the 4OG shack these days, as Cliff has at long last decided to give 50 Mc. a try.

Ipswich (4WS).—Not much news from here this month, but big moves are afoot in Ipswich and we hope to have a swag full of notes for the next issue.

In response to my plea for information (September notes) I am very pleased to be able to report that about a dozen VK4 Hams wrote to me

Amateur Radio Station

LOG BOOK

for use by:

- Radio Amateurs
- Experimenters

This log book has been designed to fulfil the need for a standard log. Radio amateurs and experimenters will find that they can keep their log books uniform while at the same time having on hand a permanent record not only of experiments and QSO's, but also of outstanding work done by the station—records that can be shown with pride.

Price 3/6 each, plus 7d. reg. post, or four for 12/-, plus 1/- reg. post.

TECHNICAL TOPICS

Radio Handbook

Here is another publication of interest to the radio amateur. Many servicing problems that confront the technician are dealt with in this reference book. Size 7¼ in. x 9¾ in., stiff cover bound. First edition.

Price 7/6, plus 9d. reg. post.

Both available from

MINGAY Publishing Co.

Box 3765, G.P.O., Sydney

during the past month giving details of the gear being used, activity and personal items. Many thanks, chaps.

SOUTH AUSTRALIA

The monthly general meeting of the Institute was held at the usual time and place to a very representative gathering. Max Farmer (5GF) gave a very interesting demonstration of V.H.F. working both in theory and in practice. Max gave an impromptu demonstration of 50 centimetre working, probably the first in VK5, if not in VK. This portion of the lecture was of undoubted interest, and many and varied were the questions asked. 5LF proposed a vote of thanks which was received with acclamation. Signing the visitors' book were a lot of very bad writers, but I managed to decipher the following: ZL2LT, VK2IQ, ex-G3CNW (who by the way is settling here) and a cordial welcome was extended to 5AC, 5MY and 5LC (long time no see). Members were notified of the forthcoming Xmas Social which is always held in conjunction with the I.R.E., and which will be held this year at the Arcadia Cafe on Thursday, 9th December. The guest speaker will be the "Proff." Sir Kerr Grant.

Why is it that VK5 Hams get sat on hard for key clicks, over-modulation, etc., and yet VK3 and VK2 boys can sound like a thunderstorm working up. What have they got that we haven't? Don't answer that.

Why did Joe McAllister sound so subdued whilst doing the W.I.A. broadcast from "Doc's" QTH the other Sunday? Was it the psychological effect of the environment? Dear, dear me, sitting next to the medical profession at Council meetings does improve one's vocabulary. Thank you Ross.

Chief news from the city this month, strangely enough, concerns the country, to wit, Clare and its very successful field day. Unfortunately I was not present, but my spies were definitely there, and I heard that the field day celebrations were officially opened by 5KC in the drawing room of 5XL. Ken, taking the position very seriously, started with a splendid flourish of the wrist, and when the panic had settled down it was discovered that the fifty guinea carpet of 5XL had been the recipient of the first one. Needless to say, Ken was divested of all metals, and also his high rank of official opener, and the job was taken over by 5XL himself who did the job very scientifically in the kitchen sink. Later in the evening a most scrumptious supper was put on by Mrs. Catford (the XYL of 5XL) and you should have seen the eyes and faces of the boys light up (almost as bright as the 866s in the rig of 5LW when he is trying to work a KQ) when they saw, right in the middle of the table (out of reach) the most "beaut" sponge cake they had ever seen. It was at least one and a half wavelengths high, and four and a half wavelengths across (but what band—80 metres or 10 centimetres—Ed.). Everybody was then invited to "hop in," a somewhat unnecessary invitation, and then for the next half hour all obeyed Senor Rafferty's rules (no not you Ralph Amigo, sit down) of etiquette. When supper was finished, it was suggested that all the gang move over and meet the boys arriving on the train, then to adjourn and meet a couple of "opperrators." 5GF and 5LW were heard to mutter something about hating "opperrators," but you should have seen them come to life as they saw the two "opperrators" seated in the back of the car (yes, you guessed it, two telephone "opperrators").

Special mention should be made of the enthusiasm of the two new Hams 5PQ and 5KB, and the ingenuity of these two "scroungers de luxe." To attend the field day they had been on the borrow for weeks, they borrowed a Type A Mk. 3, borrowed a mike, borrowed a power supply, borrowed an antenna, and blow me down if they didn't borrow a car and head for Clare. Upon arrival they borrowed a prop from the "pub's" clothes line, and then bunged a borrowed two-way adaptor into the light socket and borrowed the "juice." It has been suggested to me that it is a pity that such enthusiasm to attend a field day is not shared by some of the high "moguls" of the W.I.A., such as the Pres., Treas., Sec., and yes, the scribe (I can take it). Anyway, a good time was had by all, which is the main thing, isn't it.

I believe that at the field day, trouble was experienced in keeping 5GF's tubes cool. Fortunately for him there was a pond close handy, and every time the tubes became exhausted a trip to the pond was made. A cow was seen to take a drink from the said pond later on in the afternoon and stagger away and lean against a fence. Whether or not the cow was gassed from the effects of dipping the exhausted tubes in the pond, I would not know as I was not there.

Talking about fences, there seems to be quite an argument going on as to who is going to pay for the ten yards of fence that our organiser ripped out when his car ran backwards down hill. Never mind Joe, when the boys get the refunds from the disposal gear that they are not going to get, there will be plenty of cash around.

A recent Sunday morning broadcast by a commercial station from a suburban Church had a decided Radio Amateur flavour, with 5XU as organist and choirmaster, 5PS as relay technician, 5FQ as control technician, and 5BC as control technician at the regional station. All that was wanted was for the Minister to be "one of us" and the set-up would have been perfect. I did not hear any CQs during the Service, but some of Gordon's cross arm work on the organ sounded very close to it.

I am informed that a certain VK5 Ham nearly had to have the "Doctor" when he discovered that he had accidently been parked on 3WI the other

TRANSFORMERS, CHOKES, ETC.,
Manufactured to order. Following stock sizes available:
SOLVE YOUR MAINS TROUBLES WITH AN AUTO TRANSFORMER
Tappings at 110, 190, 200, 210, 220, 230, 240, 250, or where desired.

200 Watt	£2 10 0
500 Watt	3 10 0
1000 Watt	5 0 0

POWER TRANSFORMERS . . .

600 Volts aside, 250 M/A.	£3 5 0
880 Volts aside, 300 M/A.	4 17 6
1250 Volts aside, 400 M/A.	6 17 6

Tappings taken out where desired.

POWER TRANSFORMERS and CHOKES Re-wound—Reasonable Prices.

WHILE THEY LAST! FIRST QUALITY OIL FILLED HIGH VOLTAGE FILTER CONDENSERS.

2 Mfd. 3000 volt working CHANEX	£1/12/6 ea.
2 Mfd. 2000 volt working CHANEX,	£1/5/- ea.
4 Mfd. 600 volt working CHANEX,	5/-ea.
10 Mfd. 450 volt working T.C.C.,	8/6 each
8 Mfd. 400 volt working T.C.C.	7/6 each

Other sizes also in stock. List forwarded on request.

TYPE 11 TRANSCEIVERS (as New); Working (each)	£22 10 0
TYPE 19 TRANSCEIVERS (Less Valves)	5 0 0
BENDIX FREQUENCY METER—Complete with Calibration Book; original Crystal; as New (One Only)	40 0 0
Crystals as illustrated, 40 or 80 metre, AT or BT cut. Accuracy .02% of your specified frequency	£2/12/6 each
20 metre Zero Drift	£5/0/0
Large, unmounted, 40 or 80 metre	£2/0/0

Special and Commercial crystals. Prices on application.
CRYSTALS REGROUND . . . . £1/0/0 each

BRIGHT STAR CRYSTALS may be obtained from the following interstate firms:—
Messrs. A. E. Harrold, 123 Charlotte Street, Brisbane; A. G. Healing Ltd., 151 Pirie Street, Adelaide; Atkins (W.A.) Ltd., 894 Hay Street, Perth; Lawrence & Hanson Electrical Pty. Ltd., 120 Collins Street, Hobart.

A.W.A. SPLIT STATOR TRANSMITTING CONDENSERS, high voltage . . . . . £2/15/0 each
SCREW TYPE NEUTRALIZING CONDENSERS (National type) to suit all triode tubes, Polystyrene Insulation . . . . . 19/6 each
Prompt delivery on all country and interstate orders. Satisfaction Guaranteed

BRIGHT STAR RADIO. K. G. Allen (late R.A.N.)
1839 Lower Malvern Road, Glen Iris, S.E. 6, Victoria. Phone: UL 5510

Sunday morning. Anyway it helped to balance out the many occasions that 5WI had been the recipient of VK3 QRM. Had the said Ham been V.F.O. he could have easily moved away. You beaut!

Received from one of my spies up North, a pair of what is known as "bull protectors," and according to what is written on them they must be worn on the ears when listening to the Northern Net. My childish and innocent mind cannot imagine what it all means, so I am forwarding one to the Editor (bless his heart) and perhaps he, being much more sophisticated than I, he will be able to explain. (I wonder what he means—Ed.)

Judging by the "pats on the back" a certain VK5 Ham is giving himself regarding signal strength, excellent phone quality, and general ability, he has never heard of the eleventh commandment, to wit, "Never take oneself too damned seriously."

5XO was heard to remark on the air that he had a very vicious type of QRM near his QTH, and then in the next breath said that 5YQ lived nearby. I might have misunderstood it Charlie, but those words could mean swords or pistols, hi.

The Contest and Spring woke the old hibernate 5RX from his slumbers, and I heard George snaring some choice contacts. Very foxy is George, probably one of VK5's top CW DX boys, but you would never think it. Talking of Spring, rumour has it that 5BW "in the spring a young man's fancy, etc.," need I say more.

Switching from forty to six metres makes a noticeable difference to the quality of the W.I.A. Sunday morning broadcasts. On forty, the quality is good Amateur phone, whilst on six, the quality tiddley winks. What is wrong Reg? Ionospherical refractional bifocal convexical collywobbles.

Rumour has it that the Northern Gang have got together and intend to print their own Ham newspaper. What about a copy for me fellows?

Released in the press this month was an announcement to the effect that the military at Keswick Barracks had purchased two 500 watt transmitters which would be available to Amateurs in the Service to use in the Amateur bands as part of recreational facilities. 500 watts, blime! I certainly am glad that I do not reside in that area.

5VM is rebuilding—that is, he is changing the shower roses from p.p. to parallel. Reckon 5BA keeps his crystals in a bottle—well the bottle had 3 Xs on it so what else could it be. Glad to meet you OM. No doubt about 5AX. Les kept us all happy looking at the one-watter.

5LC is leaving the North for Adelaide soon. 5GS went back to Kadina from the field day and had mushrooms (from Clare) and QSOs into the early hours of Monday morning. Have you heard 5AP on CW lately? It's not so good. Ron has to send with his left foot now—Nance will sit on his right knee!

WESTERN AUSTRALIA

The October meeting was held on the 11th, and there were 48 members present. A new member, VK6AV, Ivan Norman, was elected. It was decided to hold the VK6-DX Contest at the latter end of November, the rules being obtained from an existing Contest.

We received information that we will not be able to use the present premises for meetings in the future, and all members will be advised of the new rooms as soon as arrangements have been finalised.

6SA mentioned the difficulties encountered in having "Commercial Pirates" on Amateur bands. A report will be submitted by the Council to F.E. to ascertain what can be done to overcome this problem.

6RU said that it is believed that the S.A.R.L. are destroying QSL cards received for non-members in South Africa. The I.A.R.U. will be contacted to investigate this situation.

Country members please note that the Annual Dinner will be held on 3rd December at the Marelle Tea Rooms, Hay Street, Perth, and a cordial invitation is extended to you all, to be present should the occasion permit.

6FC gave an interesting lecture on the equipment at his station. Antennae, transmitters and receivers with circuits were dealt with in detail. Frank has equipment for 7, 14, 27, 28, 50 and 144 Mc., AM and FM.

The difficulties encountered with his 144 Mc. Transmitter proved to have been of great assistance to other members intending to get on that band.

6JS produced a Wire Recorder, and we heard ourselves as others hear us on the air. It is hoped that Jack will be able to give a similar demonstration when the "bugs" are ironed out of that equipment.

6WS "Skipper" came into his own by handling an Auction Sale of junk that was brought in by the Amateur for the Amateur, at this meeting. The sale went very late, and the meeting gradually dwindled and wound up shortly after 11 p.m.

PERSONALITIES

6ND is now putting out a signal on 28 Mc. and with his new beam, Neville is making his mark on the "Shift-Workers' Band." 6TX has been getting into some nice 7 Mc. phone DX. A ZE contact pleased him immensely. Hope the new QTH is OK Jack. 6DX was down town recently and did the rounds of the Disposals stores. 6WH surprised us with the news that he is going to QSL 100 per cent. We reckon Ted will wear the mill out by the time all the cards are typed.

6AQ of Toodyay. What's happened up there Leo? Don't tell us the DC mains keep you guessing! 6RL hunting the DX on 28, 14 and 7 Mc. Ralph's 8 watts is bringing him some very FB QSOs. 6WD is still on 7 Mc. phone and CW. Wally's new crystal mike sounds good too. 6XI lost his 28 Mc. beam in a recent storm. Fortunately, it didn't go far—only came to rest on the roof of the shack! 6LM puts out a whale of a signal on 7 Mc. If Lionel doesn't get S9 from VK3, he doesn't blame conditions!

6HW travels around the band with a VFO. It's a good note Harry but what about putting some speech on it now and then? 6FR is busy with other things these days but his new receiver is finished so he at least knows what is going on and where! 6OR with a new exciter, John has settled down at last—we hope! 6JN heard chasing bugs out of the new modulator. John's phone rig is doing quite a good job on 7 Mc. 6BG says 6KE knows all about bee keeping! Keith knows a good place for a bee hive and it's not in the roof of his shack either. Who got the most bites Peter OM?

6RU did a good job in the VK-ZL Contest on CW. Jim's got it all sewn up. 6KW active entrant for the phone section of the Contest. These two chaps keep VK6 well on the map. FB Ron. 6AG was popular when he announced the arrival of some long awaited Disposals gear. Just about every VK6 will be VFO now. 6FA has ideas about increasing power. How's it going Dick? Did we hear you on 28 Mc. the other day? 6SN has the antenna up at his new QTH. It's working well.

6CM came to light with his WAC. FB Bill, you have certainly earned it. Does HC1JW QSL? 6WZ has a new receiver going now. FB Harry, how about a line or two OM? 6CN tidied up the rig recently, ahem! Cyril is a going concern on all bands. 6EL also of Geraldton fame, has a fine list of post-war DX. Good show Ern! 6RT sported himself a crystal mike. Len puts out a really nice signal on 7 Mc. phone.

6DJ hasn't been heard on so much lately. Those harmonics keep Bill busy. DX has been plentiful too! 6GS and 6RK can be heard every Sunday after the W.I.A. Broadcast on 7 Mc. How about coming up for the W.I.A. Dinner, Blake? 6XF has some FB phone on 7 Mc. They say that Katanning is the capital of VK6 on his QSL card. 6WG and 6HT: what's going on down there in Albany, Grace? Can't you put the boys into action again? Haven't heard Harry for ages. 6AK has the Type A Mk. 3 working well. That phone is really nice Gordon. ZS6OR now has a signal on 7 Mc. also. The gang have been looking for you Len. 6CK is going quietly for a while, but we know what one of Colin's New Year resolutions will be! 6FB still designing his new receiver. It is already working but it will be a super blooper when it's finished. FB Frank!

TASMANIA

The October meeting of the VK7 Division was attended by some thirty members and after the general business was concluded, an interesting and instructive lecture on beam construction was given by Athol Johnston 7AJ. By the way, Athol seems to have suicidal tendencies the way he describes his "diving up and down" the pole on which the beam is mounted.

During the month VK7 lost one of its newer Hams —7OL—who has been transferred to VK3. He was suitably farewelled over several glasses of the "cup wot cheers" and given a presentation by the VK7 lads. Best of luck in your new QTH Lin and hope to hear from you from time to time.

I found out a dark secret a couple of weeks ago. 7EJ hasn't even a key jack in his transmitter, what do you do Ted, flick the mains switch off and on for CW operation.

7OM has taken to swimming during the winter months, he still doesn't know whether he fell or was pushed, want to watch that "Green Label" Bob.

7BJ has built a rotatable beam, he gets out and moves the pole round to get rotation, very crude but apparently quite effective.

7CF at Lake Margaret on the West Coast is putting in a nice signal on phone to Hobart and 7JH at Waddamana can be heard occasionally on CW.

7LJ has just rebuilt and in fact nearly every Ham in Hobart has rebuilt, is rebuilding or intends to rebuild, so I think yours truly can make enough lucre to rebuild also.

Two of our Associates sat for their tickets at the October examination, and are now anxiously awaiting a thick or a thin envelope to tell them their fate, anyway, best of luck Ken and Don.

It is hoped by the Southern Gang to make a visit to Launceston early in November and hold a Hamfest up there. The newly formed Launceston or Northern Zone is functioning very nicely now and its membership increases at every meeting, thanks to the good work put in by the organisers of the show. Anyway, get the larders stocked you chaps because if it is a hot day, I am going to be very thirsty.

FIFTY AND UP

NEW SOUTH WALES

All bands very active owing to the VHF Contest which is currently operating now and everybody very enthusiastic. Stations 2ADT and 2BZ in Newcastle and 2LZ and 2LY in Katoomba seem to be well to the fore at this stage in points scoring, but results will probably fluctuate as time goes on.

No DX break-through as yet, but everybody living and listening in high hopes that Sporadic E reflections will appear soon.

2WJ, 2LY, 2AH, 2ABZ, 2VW, 2LZ, 2ABS and 2ND can be heard nightly chasing points on 50 Mc. and at the same time carrying out the usual lengthy conversations irrespective of Contest or otherwise. While on 144 and 288 Mc. 2ABZ, 2LZ, 2AH and 2VW are very active discussing this and that at great length.

The following stations are co-operating to the best of their ability as time permits. 50 Mc.: 2ZN, 2AJR, 2YR, 2XX, 2ADW, 2LS, 2HL, 2DF, 2XK, 2BG, 2NO, 2FO, 2MQ and 2AZ. 144 Mc.: 2ND, 2AJA, 2IY, 2AGB, 2AZO, 2HL, 2NP, 2AZ and 2ALU. 288 Mc. 2AZO, 2ND, 2LZ and 2ABZ, 2HL and 2AJR.

Summing up the position, the suggestion of a VHF Contest would appear to prove a step in the right direction and should DX break-through, there will be plenty of observers to hear it because one can note some of the pre-arranged skeds being made at all times of the day and night.

The October general meeting of VHF Section was held on Friday, 8th October, in Science House with an attendance of 33. The lecture was given by Messrs. Andrews and Maycock, engineers of A.W.A. Co. Ltd., and they chose for their subject "FM Receivers and Transmitters." The lecture was very well received and proved very interesting and instructive. 2AWW moved a vote of thanks on our behalf to Messrs. Maycock and Andrews.

Next meeting will be held on 2nd Friday of November in Science House and the lecture will be delivered by Mr. Holloway of A.W.A. on "VHF Receiver Design." All are looking forward with great interest to Mr. Holloway.

QUEENSLAND

50 Mc.—Report late in September that the Townsville Beacon was being heard in Northern Rivers about sunrise, caused many VHF men in this State to rise early, however no report of any success has been received. 4PG and 4HE have now joined the 50 Mc. fold. On 23rd September at 2000 hours, 4GD of Townsville, heard a station which sounded like W phone, on 50.1 Mc. A new channel was opened up this month with 4CU of Clifton working 4KK of Milmerran. Another Clifton 50 Mc. fan, 4AF, is looking for someone who will be game enough to shin up Arch's 60 ft. pole to replace the 50 Mc. antenna which was blown down recently. VK5KL, of Darwin, is believed to be running a signal continuously on this band and hopes to make contact with Asia soon.

144 Mc.—Brisbane VHF men 4HR, 4RY and 4ZU turned their beams westward last month in the hope that contact would be made with 4XN of Dalby. But their luck was out. Two country members, 4TY and 4KK, hope to make history by putting the first 144 Mc. sig across the Downs. Wish you luck Norm and Keith.

VK6KW's 144 Mc. EQUIPMENT

The equipment of this Station consists basicly of a Bendix type SCR522, modified for use on this band. The main modifications have been carried out on the receiver, and the line-up now consists of a 9003 RF stage (original), 9003 Mixer (original), 9001 Harmonic Amplifier (original), and a 9003

Oscillator. This last type was originally a Harmonic Generator.

The I.F. stages have been left as they were, but the audio system has been altered, and although the tubes are still being used, the transformer coupling and intercommunication systems have been removed. The two ganged condensers have been ganged together, with one common dial being used. The over-all sensitivity of the receiver and audio gain seems to be quite good.

The transmitter is practically as it was originally. With the automatic frequency changing apparatus left in its entirety, four crystals being available for selection from a four-position switch, which is mounted on the rack, but provision for keying tone has been incorporated.

A pressel switched type hand-set is being used for both microphone and receiver with press-to-talk operation, relays being used for the change over. A 12 volt battery provides DC for the relays, but the rest of the power comes normally from an AC pack providing separate supplies for filaments of the receiver and transmitter. A loudspeaker is also provided and there is ample volume from the 12J5 output tube.

The station can be made portable in a few minutes, by using a portable power supply consisting of a No. 19 genemotor. The genemotor circuits have been modified, and provide approximately 240 volts when transmitting and 275 when receiving. The fixed bias for the transmitter is being obtained from the five 50 volt winding using a series drop resistor. This arrangement works out very well. The power input to the transmitter on AC is 15 watts and with No. 19 power supply, 8 watts. The frequency of operation from this station is mainly on the net frequency of 8007.69 Kc. multiplied by 18, giving a frequency of 144.138 Mc. There are also two other frequencies used which are as follows: 144.652 and 146.802 Mc.

The main antenna system consists of a three element rotary beam mounted on top of a 40 ft. steel tower, which carries both 20 and 10 metre arrays. This beam has a close-spaced director and a wide-spaced reflector. This spacing has been found to be the best on this frequency, by experiment. The feed-line of the antenna is 50 ohm co-ax. When portable, the single half-wave antenna is used, which is mounted on to the hood of the vehicle. However, for field days the three element beam is used. This can be mounted on a suitable mast of the collapsible type.

144 Mc. DIGEST by W. J. Hartley

Splendid weather conditions prevailed for the October 144 Mc. Field Day in VK3, the outlook no doubt acted as a spur to the large number of stations that were heard working over the band. The ever reliable brothers in Jim and Fred Bail (3ABA-3YS) put in an appearance with their portable gear at One Tree Hill in the Christmas Hills where they made 10 contacts, this location is 900 feet up and 22 miles out from the City. The No. 2 party consisted of 3ASG and 3HE, the combination providing 4 watts to p.p. 2C22s, three element beams and a three tube rush box, their location was also on a one tree hill but at Ferntree Gully and judging by the colossal signal put out it can only be surmised that the location is now treeless.

Added interest to the day was the advent of the Geelong boys in 3AKE, 3BU, 3VF and 3BW, while the townites were 3AJ, 3ACM, 3LH, 3EW, 3EM, 3ES, 3HK, 3TO, 3JO, 3LS, 3BQ, 3LX and 3ADC. The last three calls being newcomers to the band.

In view of the way that the low end of the band is always a football scrum, 3XM went portable to Berwick where he had no trouble working 3CI who was putting out a R5 S8 signal. 3CI in this case was at Mt. Fatigue with most of his signals going up above the fog layer. Nothing was heard of 3UI-3ABG outfit at Mt. Major or any of the North-Eastern gang. It seems quite clear that if we are going to reach out on this band, a mapped programme to include the country networks is needed also a set-up as to what stations are going to use certain locations, for at present on all field days all the portable signals are always to be found concentrated on the city stations, so from a propagation point of view it would be more logical by a pooled fuel idea to provide for the best and most efficient mobile unit to be sent right out to the Never-Never and put signals to all points of the compass according to schedule and by this means it would make way for Interstate contacts.

At present there are several country groups working away without any outside help and it would be quite fitting as a reward for their interest if the above was brought about.

During the past month 3YJ, ex-166, made the band with 522 gear providing quite a nice signal, great improvement is noticed in the increased power at 3ABA home's location. 3ZL, of Ballarat, is now on a 144 Mc. Converter and it is hoped that 3AJR will follow suit. 3TO is back on again with a temporary mast without any effect on his good phone. It is understood that the following calls will soon be heard: 3APG, 3PG, 3DZ and 3MP. 3ACU, ex-5CU, is due on at any time now and from Toorak. Colin of 3ACM fame, has a very posh portable gear in hand for the next field day and the operator himself has to wear sun glasses on account of all the gear being nickel plated.

3BU, 3AKE and 3AJF are all on with the 522 gear, all are using 4 element beams on the following frequencies respectively: 144.65, 147.0, 144.13 Mc. 3WT at present is using a CV6 transceiver and 3APG is on receiver only. The evergreen 3BQ hit the band with a sensational signal from the following line-up: 6C4 straight CO on 8109 Kc., 6V6 doubler, RK34 trebler, RK34 ditto and a pair of TV05/12 Mullard triodes neutralised P.A. feeding a horizontal dipole 27 ft. high; input to P.A. is 12 watts at present and later will be increased to 30 watts, why! For his first field day work, 3LX got around in grand style, he is using a 522 gear for both purposes and is running 15 watts to the final, antenna is a half-wave dipole horizontal and a 60 ohm co-axial feed line up to 25 ft. high.

To date there is no progress results to hand from N.S.W. as to the three months VHF three-band Contest, the only news is that both 2NO and 2RF are having contacts over a half-mile distance on 576 Mc., equipment in use are mod. osc. using the Lighthouse tubes and super regen. receivers.

Activity on 144 Mc. is still at a high level in VK5 with about 18 stations on the job. A very interesting 50 Mc. field day was held with successful operations between the Clare Show Grounds to the top of Mount Lofty. The outfit at the Mount was in the hands of 5JO-LJ-QR and consisted of a converter hitched onto a car radio as the receiving medium, while the transmitter was a 6V6 CO, 6V6 into a 832 for 12 watts to a 4 element Edward P. 300 ohm line beam. Contact on 50 Mc. was made at 1500 hours to 5GF at the Show Grounds. 5GF's signals were R5 S8 from an antenna of three elements 12 ft. high, on this test horizontal gave better results than the vertical. 5ME while at the Mount did not get by so well probably due to having a unsuitable antenna.

Doug of 7AB, the lone VHF worker on 144 Mc.! The nearest is the Launceston 144 Mc. network 100 miles away. At present he has to build a new converter, then things will come 3CI's way. The Launceston gang are using super regens. and S.E. Osc. or M.O.P.A's.

The Mount Gambier boys are still on the lookout and it would indeed be a help if the N.W. and S.W. Zones could play ball with them.

FOR SALE, EXCHANGE, WANTED

9d. per line, minimum 2/-

Remittance must accompany advertisement. Calculation of cost is based on an average of six words per line.

FOR SALE.—AR8505 7 tube RCA Communication Receiver (like National NC44). Tunes 540 Kc. to 30 Mc. in 4 bands. BFO, separate bandspread scale 0-100, 240 v. AC operation, £35 or nearest offer. All enquiries answered—VK7AL.

FOR SALE.—Brand new, unused RCA 803, 125 watt diss. pentode, ceramic base suppressor conn. VK3BG, 25 Panoramic Road, North Balwyn.

FOR SALE.—Complete 20 watt station AC operated A.W.A. Teleradio Phone or CW, 7 Mc. Crystal, Key, Mike, four tube T.R.F., Batteries, Phones, etc. Price £26. Consider exchange for good AC Communications Receiver. FJ 6792 (day) or 35 Valley Pde., Glen Iris, Victoria.

FOR SALE.—Home-built Ham Receiver—6K7 R.F., 6L7 Mixer, 6K7 H.F. Osc., 6K7 I.F., 6N7 and 6F6 output; two sets of three plug-in coils; separate R.F. section for 56 Mc. band using R.F., Mixer and H.F. Osc. stages. Eddystone components used throughout including special 3 stage wide-band I.F. unit at 2,000 Kc. Complete under-chassis components, provision for speaker in front panel, constructed in aluminium case approx. 21" x 21" x 12" deep; built-in power supply using 83 rect.; £10 or offer.

FOR SALE.—56 Mc. Crystal Controlled Transmitter, see "A.R." Nov. 1938, for complete details. Tube line-up 42 C.O., 6V6 Quadrupler, 6L6 Doubler, 807 P.A. Constructed on "Masonite" chassis and panel. Useful components include Eddystone condensers and dials, Isolantite sockets, feed-thru and stand-off insulators, by-pass condensers, resistors, coils, etc., 0-100 Ma. meter, with genuine Radiotron 807; no other tubes or crystals; £2/10/- or offer.

FOR SALE.—56 Mc. Resistance-Coupled Superhet. Receiver, tube line-up 57 Mixer and Osc., 58 1st I.F., 58 2nd I.F., 56 2nd Det., with tubes and all other components, £1/10/- or offer. Write to H. N. Stevens, VK3JO, 33 Auburn Grove, Hawthorn East, E.3, Melbourne.

FOR SALE.—Transceivers: 108 Mk. 2, 108 Mk. 3, £8 each. Type A Mk. 3 with power pack, spares and carrying cases, new, £10 each. FS6, complete with power unit, £10. TR1196, 9 tubes and genemotor, £9. All are complete with tubes, mike, phones, aerial and power units. No batteries with 108s which have been used. Transmitter: S53, a 250 watt job in steel cabinet with racks containing power supply (with low input switch), modulator, 14 sockets, exciter and amplifier, no tubes, £20. Power Unit: Type S for AT5-AR8, two new 866A tubes, £15. Microphone: Dynamike, new, £6/10/-. Headphones, single recr., S.T.C., L.R., 12/6 doz. Owing to change of Quarters I am cramped for room, hence sale. E. Kerby, VK3KK, 85 Auburn Road, Auburn, E.2, Victoria.

FOR SALE.—Two valves 809 new, 25/- each. One type 522 Transmitter VHF 100-150 Mc., complete less power supply.—VK3MN FU 3137.

FOR SALE.—Type A Mk. III, complete with spares, plus 13 QST, 14 Radio News, 2 Radio Craft, 3 Radio World. R. H. Hovey, 20 Sixth St., Parkdale, S.11, Victoria.

WANTED.—FS6 Transceivers complete or parts. Also want 100 Kc. Crystal. Prices and particulars to J. McLennan, 20 Ferry St., Ewardstown, Adelaide.

RED LINE

TRANSFORMERS OF DISTINCTION

RADIO RECEIVER TYPE

The transformers listed in this section have been designed specifically for use by manufacturers in standard types of radio receiver sets; but they may, of course, be applied to any electrical apparatus for which their specifications make them suitable.
Coil temperature rise with continuous operation will not exceed 30-35 degrees Centigrade over ambient.
These units are constructed to permit sub-panel wiring, and are fitted with drawn steel covers finished in smooth transmission grey.
All these units are baked and impregnated with super insulating varnish and are specifically made for use under adverse climatic conditions.

Item 1. **Type No. 4212**

Prim: 240v . . . 35vA 50cps
H.T.: 210 CT 210v . . . . . 40 mA
Fils: 5v-2A 6.3v-3A
Base: 3 x 2½ x 2" H . . . . . Wgt 2lb. 8oz
Mntg: H2 . . . . . "S" is 1¼"

Item 2. **Type No. 4282**

Prim: 240v . . . 37vA . . . . . 50 cps
H.T.: 280 CT 280v . . . . . 40 mA
Fils: 5v-2A 6.3 v-2A
Base: 3⅜ x 2⅞ x 1¾" H . . . . . Wgt 2lb 13oz
Mntg: H14 . . . . . "S" is 1"

Item 3. **Type No. 6382**

Prim: 200-230-240v . . . 45vA . . . . . 50 cps
H.T.: 385 CT 385v . . . . . 60 mA
Fils: 5v-2A 6.3v-2A
Base: 3⅜ x 2⅞ x 1¾" H . . . . . Wgt 3lb 12oz
Mntg: H14 . . . . . "S" is 1⅜"

Item 4. **Type No. 6292**

Prim: 200-230-240v . . . 40vA . . . . . 50 cps
H.T.: 290 CT 290v 60mA
Fils: 5v-2A 6.3v-2A
Base: 3⅜ x 2⅞ x 1⅞" H . . . . . Wgt 3lb 2 oz
Mntg: H14 . . . . . "S" is 1⅛"

Item 5. **Type No. 8383**

Prim: 200-230-240v . . . 60vA . . . . . 50 cps
H.T.: 385 CT 385v . . . . . 80 mA
Fils: 5v-2A 6.3v-3A 2.5v-5A
Base: 4 x 3½ x 2⅛" H . . . . . Wgt 4lb 14oz
Mntg: H10 . . . . . "S" is 1¼"

Item 6. **Type No. 8382**

Prim: 200-230-240v . . . 60vA . . . . . 50 cps
H.T.: 385 CT 385v . . . . . 80 mA
Fils: 5v-2A 6.3v-3A
Base: 4 x 3½ x 2⅛" H . . . . . Wgt 4lb 12oz
Mntg: H10 . . . . . "S" is 1¼"

Item 7. **Type No. 8302**

Prim: 200-230-240v . . . 54vA . . . . . 50 cps
H.T.: 300 CT 300v . . . . . 80 mA
Fils: 5v-2A 6.3v-3A
Base: 4 x 3½ x 1¾" H . . . . . Wgt 4lb 2oz
Mntg: H10 . . . . . "S" is 1"

Item 8. **Type No. 10382**

Prim: 200-230-240v . . . 62vA . . . . . 50 cps
H.T.: 385 CT 385v . . . . . 100 mA
Fils: 5v-2A 6.3v-3A
Base 4 x 3¼ x 2¼" H . . . . . Wgt 5lb 11oz
Mntg: H10 . . . . . "S" is 1½"

Item 9. **Type No. 10302**

Prim: 200-230-240v . . . 52vA . . . . . 50 cps
H.T.: 300 CT 300v . . . . . 100 mA
Fils: 5v-2A 6.3v-3A
Base: 4 x 3½ x 2" H . . . . . Wgt 4lb 10oz
Mntg: H10 . . . . . "S" is 1¼"

Item 10. **Type No. 13282**

Prim: 200-230-240v . . . 80vA . . . . . 50 cps
H.T.: 385 CT 385v . . . . . 125 mA Cond. Input
Fils: 5v-2A 6.3v-3A
Base: 4 x 3½ x 4¼" H . . . . . Wgt 6lb 9oz
Mntg: H10 . . . . . "S" is 1¾"

D.C. Volts	Choke Input	Cond. Input
5V4	310v	430v
5Z3	300v	400v
5Y3	275v	360v

Cut out and file for reference

RED LINE EQUIPMENT PTY. LTD.—Transformer Engineers

WORKSHOPS: Cent. 4773.
2 Coates Lane, Melbourne.
City Office: MU 6895 (3 lns.)
157 Elizabeth St., Melbourne.
DISTRIBUTORS
SOUTH AUSTRALIA:
Gerrard & Goodman,
Radio Wholesalers Pty. Ltd.
Newton McLaran Ltd.
NEW SOUTH WALES:
United Radio Distributors Pty. Ltd.

DISTRIBUTORS

VICTORIA
Homecrafts Pty. Ltd.
Arthur J. Veall Pty. Ltd.
Radio Parts Pty. Ltd.
Howard Radio,
and all leading wholesalers.

QUEENSLAND:
A. E. Harold,
B. Martin.

A GUARANTEE OF DEPENDABILITY

AEGIS KC4

4-Band Tuning Unit

The most advanced

COIL ASSEMBLY

ever offered in AUSTRALIA

Now Available
Long Awaited
300 OHM
Transmission Cable
5d. per yard plus tax

Here's something for the EXPERTS

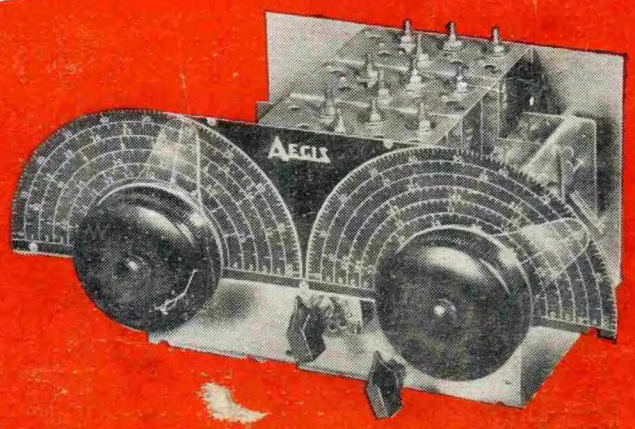
The new Aegis 4-band, bandspread tuning unit illustrated at right is definitely the answer for the amateur who desires to build his own communication receiver. Here are the plain facts of this latest Aegis triumph:

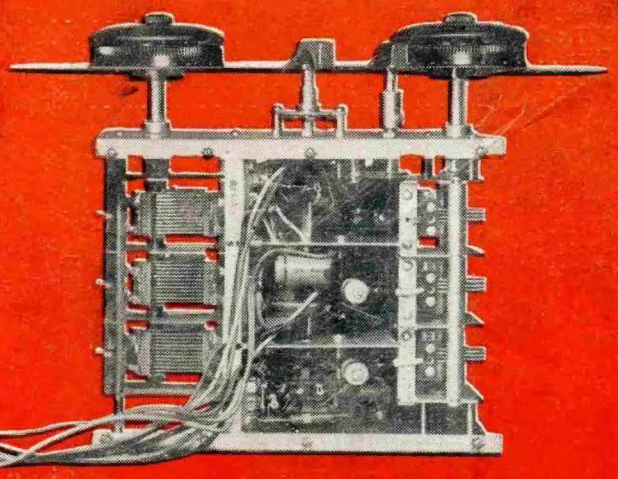
4 Wave Bands		Band Spread—5 Bands	
550 Kc. — 1500 Kc.		3.5 — 4.0 Mc	80 Metres
1500 Mc. — 4 Mc.		6.9 — 7.3 Mc.	40 Metres
4 Mc. — 11 Mc.		14.0 — 14.4 Mc.	20 Metres
11 Mc. — 30 Mc.		20.5 — 22.0 Mc.	15 Metres
		27.0 — 30.0 Mc.	10 Metres

Actually constructed in 3 sub-sections comprising R.F., Converter and Oscillator stages. Finally assembled in one unit, which incorporates Band Set and Band Spread ondensers, together with 2 Slow Motion Drive Assemblies 55/1 and directly calibrated Plastic Dial. Valve Sockets for R.F. (6SK7GT) Mixer (6AC7) and separate oscillator (6SK7GT) stages are already wired. Concentric air trimmers are used throughout, and the 6 section "Oak" Type Switch includes shorting banks for all coils not in use. Aerial Trimmer is brought out to front panel with ¼" shaft. Screws for iron core adjustment in all coils are readily accessible from top of unit, as are also the Trimmer Screws.

For use with the KC4, we recommend Aegis I.F.'s Type Nos. J22 and J23, specifically designed for communication work. A complete set of blueprints for connecting this unit plus a most comprehensive communications Receiver Circuit are supplied with each Kit.

See your distributor right away for your Aegis KC4 Coil Assembly.





AEGIS

MANUFACTURING CO. PTY. LTD.
208 LIT. LONSDALE ST. MELB.
PHONE CENT 4414, 5171

DISTRIBUTORS IN ALL STATES

MELBOURNE:
Lawrence & Hanson Electrical Pty. Ltd.
Replacement Parts Pty. Ltd.
Vealls Electrical & Radio Pty. Ltd.
Homecrafts Pty. Ltd.
J. H. Magrath & Co.

SYDNEY:
John Martin Pty. Ltd.
George Brown & Co. Pty. Ltd.
Fox & Macgillycuddy Ltd.
Cook Bros. Pty. Ltd.

ADELAIDE:
George Procter (Factory Represeetative)
Newton, McLaren Ltd.
A. G. Healing Ltd.
Harris, Scarfe Ltd.
Oliver J. Nilsen & Co. Ltd.
Gerard & Goodman Ltd.

BRISBANE:
Chandlers Pty. Ltd.
A. E. Harrold Pty. Ltd.
B. Martin Pty. Ltd.

PERTH:
Nicholsons Ltd.

TASMANIA:
Lawrence & Hanson Electrical Pty. Ltd. (Hobart)
Lawrence & Hanson Electrical Pty. Ltd. (Launceston)